2007 Meadowlands District Transportation Plan

New Jersey Meadowlands Commission

2007 Meadowlands District Transportation Plan

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EXECUTIVE SUMMARY

INTRODUCTION

The Hackensack Meadowlands Transportation Planning Act (the Act), effective June 24, 2005, established a Transportation Planning District within the Meadowlands District. The law requires the creation of a comprehensive District-wide transportation plan that will designate transportation projects and associated funding needed to sustain future economic growth. The Act empowers the New Jersey Meadowlands Commission (NJMC) to assess fees on future District development based upon a technical analysis of anticipated development and its projected impact upon the transportation system.

The objective of the Meadowlands District Transportation Plan (the Plan) is to identify transportation needs, recommend specific improvements, and estimate costs of improvements over a time frame that reaches to the year 2030. The Plan also creates a fee assessment framework to establish the process by which the NJMC will assess fees upon private developers to finance identified improvements recommended for inclusion within this Plan.

DEMOGRAPHIC AND TRANSPORTATION CONDITIONS

The first step in the preparation of this Plan was to assess existing and future transportation needs. This assessment involved compiling and reviewing information on existing development and transportation facilities and services within the District.

Currently, over 86,000 employees and 3,600 housing units are located within District boundaries, and a substantial increase in both non-residential and residential development is anticipated in the future. The NJMC estimates that there will be over 40,000 new employees (mostly in retail, warehouse, and office developments) and almost 6,800 new residential units by 2030. It is noted that these totals include several major projects that by statute will be exempt from the fee assessment process.

The District's existing transportation system includes commuter rail, regional and local bus networks, pedestrian and bicycle facilities, several major regional roadways, and numerous local streets. There are several "committed" transportation projects that are currently funded

and are anticipated to be completed within the District and region by 2030. Committed projects are considered in studying the transportation system; however, the Act does not permit impact fees to support these projects, since traffic impacts are expected to be addressed by separate developers' agreements.

The analysis of the District's transportation system with a regional transportation model indicated that under existing conditions, the number of vehicle trips exceeded the system's capacity at certain locations, resulting in specific transportation needs within the District. Under the future 2030 "build" scenario, these needs will increase as each of the major roadways will experience rising levels of congestion. Additional analysis further defined needs relating to public transit, roadways, and pedestrian and bicycle access. This analysis used various analytical techniques and tools to identify needs and proposed improvements to address those needs.

CANDIDATE IMPROVEMENTS

The analysis identified a full range of candidate transportation improvements in all modes and sub-elements of the transportation system that are recommended to address existing and future needs and provide reasonable travel conditions within the District.

This analysis further identified the portion of improvements attributable to existing versus future development, which is essential because under the Act the NJMC can only assess fees for improvement costs attributable to future development within the District.

ESTIMATED COSTS OF CANDIDATE IMPROVEMENTS

The estimated costs of the recommended improvements were proportioned by applying the percentage of existing versus future transportation needs. The cost estimates found that the total costs of all candidate improvements are approximately $480 million, of which about $300 million are attributable to future development. District-wide programs, planning activities, and administration are also included in the costs.

RECOMMENDED IMPROVEMENTS

The candidate improvements were reviewed in the context of their estimated relative effectiveness and their fiscal considerations to determine which improvements justify imposing impact fees upon private developers. The primary objective was to identify and recommend improvements that provide improved mobility or accessibility, including multi-modal connectivity, to existing and future population draws within the District. This review process led to the identification of a significantly smaller set of recommended transportation improvements that will be the foundation for the Plan. In general, recommendations include all candidate public transit, pedestrian, bicycle, roadway intersection improvements and selected roadway segment improvements. The total costs of the recommended improvements are $94.3 million, and the costs of improvements attributable to future development are $66.0 million.

FEE ASSESSMENT FRAMEWORK

The fee assessment framework within the Plan establishes the process whereby the NJMC will assess developers of new private development projects within the District a cost per vehicle mile traveled (VMT) for the total number of projected morning and evening peak hour vehicle miles generated by those projects. The analytical work for the fee assessment framework involved first determining the share of improvement costs attributable to existing development versus future development within the District.

Similar to distinguishing future versus existing improvement costs, it was important to determine both the public and private responsibilities of future improvements. The future private share allocation was determined by dividing the corresponding number of future trips due to future private development by the total number of future trips associated with the specific type of improvement. This analysis shows that 40% of the future roadway improvements, 52.45% of the future pedestrian and bicycle improvements, and 78.25% of transit improvements are attributable to future private development within the District. Based upon a summation of the private shares in all improvement categories, the estimated improvement costs attributable to future private development are $41.1 million.

The next step in the development of the fee assessment framework was to determine the cost per VMT necessary to mitigate future development impacts. Based upon the analysis of the anticipated development projects, a net total of approximately 25,000 trips were subject to fee assessment. These trips were converted into VMT using an average VMT per trip factor for each land use type. This conversion resulted in a total of 134,818 VMT for future development projects that will be subject to fee assessment. After dividing the total cost of improvements attributable to future development by the total VMT, a fee of $305.17 for each morning and evening peak hour VMT was reached.

For any new development subject to the fee, the NJMC will calculate the total fee by utilizing the appropriate Institute of Transportation Engineers (ITE) trip generation formulae. Existing, pass-by, diverted, and internal trip reductions will then be applied to calculate the number of net A.M. and P.M. peak hour vehicle trips. Each individual land use trip total will then be multiplied by the corresponding VMT per trip factor resulting in the net peak VMT. The net peak VMT will then be multiplied by $305.17 to obtain the total fee for the project.

As previously noted, the fee assessment framework also includes provisions for credits, exemptions (e.g., affordable housing), and waivers. The implementing resolution and subsequent regulations will provide a procedure for these provisions, as well as for the review and appeal of assessed fees. The NJMC will establish a process for periodically updating the fee assessment formula and fee rate calculation to account for changes in both transportation and development conditions, including cost escalation over time.

FINANCIAL PLAN

Recommended improvements were prioritized by cost over 5-year periods. Expenditures over each period were estimated assuming that the appropriate public funding agency will provide its share of improvement project costs. The resulting staging plan establishes a relatively even stream of revenues and expenditures over the upcoming 5-year periods, averaging about $6 million per period, with a zero balance at the end of the Plan time frame (year 2030).

POTENTIAL FUTURE STRATEGIES

Several potential planning and policy initiatives were identified that may be incorporated into future updates of the Plan. These strategies include public transit, bicycle and pedestrian, travel demand management, goods movement, intersection configuration, access management, safety improvements, and infrastructure maintenance. Goods movement is of particular importance since projections of significant increases in square footage of industrial development within the district will result in increased amounts of freight traffic on roadways, railways and through local ports.

CONCLUSION

This Transportation Plan is designed to be a fluid document and will be revised over time as the Transportation Planning District's needs change. As such, the NJMC intends to periodically update the Plan to reflect changes in variables such as new development, committed transportation projects, cost escalation over time, and the extent of credits, exemptions, and waivers. In this manner, the NJMC will maintain a fair and equitable program for financing improvement projects that will ensure an efficient and safe transportation system in order to sustain future economic development in the Meadowlands District.

I. INTRODUCTION

The Hackensack Meadowlands District (the District; also the Meadowlands Transportation Planning District, having coterminous boundaries) is a 32-square-mile area covering parts of 14 municipalities in northeastern New Jersey. The District comprises much of the lower tidal area of the Hackensack River watershed and supports migrating and wintering waterfowl wildlife populations. A majority of the undeveloped areas (comprising approximately 8,500 acres) within the Hackensack Meadowlands District is designated as wetlands and is under substantial developmental pressure from commercial, industrial, and residential interests.

Due to the pressure of development on natural resources in the Meadowlands, the Hackensack Meadowlands Reclamation and Development Act (N.J.S.A. 13:17-1 *et seq.*) was enacted on January 13, 1969. This legislation recognized the Meadowlands of the lower Hackensack River as "a land resource of incalculable opportunity for new jobs, homes and recreational sites." The Act cited "their strategic location in the heart of a vast metropolitan area with urgent needs for more space for industrial, commercial, residential, and public recreational and other uses . . ."

The objectives of the Act include:

- The preservation of the delicate balance of nature
- The provision of special protection from air and water pollution and a special provision for solid waste disposal
- The orderly, comprehensive development of the Hackensack Meadowlands to provide more space for industrial, commercial, residential, public recreational and other uses.

The Act also created the Hackensack Meadowlands Development Commission (HMDC) and authorized the preparation and adoption of a master plan for the physical development of the District. The HMDC, which is the land use planning and zoning authority for the District, was renamed the New Jersey Meadowlands Commission (NJMC) on August 27, 2001, to better reflect its role in the region as a State agency.

Commercial and industrial development and redevelopment have been robust within the District over the past 30 years. Lands that had been used for the grazing of livestock now have given way to office complexes, factories, and transportation infrastructure. Recent trends indicate that future development will be more intensive on brownfield sites due to rising land values and the attractiveness of tax incentives for businesses offered by local municipalities and grants offered though the New Jersey Economic Development Authority (NJEDA) and the US Environmental Protection Agency (EPA). Examples of recent brownfield development and redevelopment projects include the EnCap Golf development (a residential and recreational complex under construction on former landfills in Lyndhurst and Rutherford) and the construction of a Wal-Mart retail establishment in Kearny on the site of a former contaminated industrial site.

The development in the District and its associated employment and housing opportunities are considered a part of the New York City regional economy. In order to remain an economically viable region, it is necessary for the Meadowlands District to plan ahead for future development and its associated effects on local transportation infrastructure. A necessary component of planning for future development is to determine sources for its financial funding. To meet this challenge, the NJMC proposes assessing fees on new developments that are responsible for the travel demand burdens on the District's transportation system. This task will be accomplished through the implementation of financing strategies recommended as part of the Meadowlands Transportation Planning District Act (described later in this Chapter). Under this act, the State of New Jersey, Bergen and Hudson Counties and fourteen District municipalities, the New Jersey Meadowlands Commission, and the private sector, will together secure the financial means to respond to transportation needs on a regional basis as future transportation challenges arise. The focus will be on transportation improvements that particularly serve the needs of the anticipated development in Meadowlands Transportation Planning District.

NJMC supports economic growth that is consistent with its Master Plan and land use regulations. According to the NJMC's *Meadowlands Mobility 2030* report, demographic and market projections indicate that the District will experience substantial economic development by 2030. At the same time, the District will remain in the "crosscurrents" of development

spurred by commercial and industrial entities within the metropolitan area and throughout the Northeastern United States as traffic from these different sources constantly travel through the District along major thoroughfares, such as the New Jersey Turnpike, Route 3, Route 17 and Routes 1 and 9.

Some of the major roadways within the District are among the most heavily traveled in the country. Continued development inside District boundaries has only aggravated the situation by creating higher volumes of passenger and freight traffic that will utilize the roadway network. Additionally, the lack of direct transit connections between development centers within the District can be considered another source of traffic, leading to longer travel times as drivers are forced to use the already congested major thoroughfares mentioned above to reach intra-District destinations. As a result, various mobility issues have become apparent, including limited existing highway capacity, inadequate highway access, missing road/rail connections, and operational deficiencies.

Public transit alternatives are available to District users; however existing transit services are limited and often do not provide the mobility that is needed for those wishing to travel solely within the District. This situation is most evident when considering that a coordinated internal bus route network is not available for the District, and existing bus routes only provide limited service during off-peak hours. In addition, there is a need for increased intermodal connectivity between the existing bus and commuter rail networks inside the District, so that seamless transfers can occur between the differing modes of transportation used by riders to reach popular destinations within the District. Furthermore, pedestrian infrastructure and bicycle facilities are not integrated adequately into existing public transit stations and roadway infrastructure. This situation is leading to missed opportunities to promote cleaner air initiatives through bicycle and pedestrian transportation as an alternative no-fuel option within the District.

Looking at the overall picture of the District, it can be noted that the existing deficiencies in the District's transportation network previously mentioned in this chapter, coupled with increased development of commercial, residential and industrial sites, are leading to air pollution

(resulting from roadway congestion), lengthy travel times, higher driver costs, and decreased mobility and access for District residents, workers, visitors, and businesses. Anticipated increases in new development within the District have the potential to exacerbate these existing problems. Although various transportation improvement projects are already planned or proposed for the District to address existing needs, concerns still remain that the existing transportation infrastructure will likely be inadequate to accommodate the increased needs of future economic development within the District.

To address this situation, the NJMC has recently completed two major planning efforts that provide an initial foundation for addressing future transportation needs of the District. Both the updated *NJMC Master Plan* and *Meadowlands Mobility 2030* address transportation impacts from development within the District. The circulation element of the Master Plan further identifies several transportation issues (as described above) and claims that, "An efficient, multi-modal transportation network is critical to the overall vision for the Meadowlands District." The *Meadowlands Mobility 2030* report, although a non-technical study, supplements the Master Plan and reinforces the need for transportation system improvements to support economic growth, establishing objectives to attain that goal. The report lays the groundwork for future investments by identifying many potential projects, strategies, and actions.

One of the proposed actions involved a transportation enhancement district (mentioned earlier in this chapter), which would enable NJMC to raise additional revenue to finance necessary transportation projects. The *Meadowlands Mobility 2030* report identifies several objectives of such a mechanism and process, including a sound planning methodology, consensus-building among affected parties, a fair and equitable assessment process, criteria for "hardships," and provisions for credits and waivers for travel demand management efforts.

This proposal eventually led to the enactment of the Hackensack Meadowlands Transportation Planning District Act (HMTPD Act), P.L. 2005, c.102, on June 24, 2005, which established the Meadowlands Transportation Planning District (MTPD) and a transportation planning board for the Meadowlands District. The law gives the Meadowlands Transportation Planning Board

(MTPB) responsibility for developing and updating a comprehensive, future-oriented district transportation plan incorporating the following main provisions:

- Establishment of goals, policies, needs, and improvement priorities for all modes of transportation, including walking and bicycling, within the District for the next 24 years.
- Identification of transportation needs arising from anticipated future traffic passing within or through the District based upon future development anticipated to occur within the District, and reflected in the master plan.
- Proposal of transportation projects designed to address future development, prioritized over increments of five years.
- Inclusion of a financial element setting forth a statement of projected revenue and expenses, including all project costs.
- Identification of public and private financial resources which may be available to fund, in whole or in part, those transportation projects set forth in the Plan.
- Recommendation of types and rates of development fees, formulas to govern the assessment of those fees, and the projected annual revenue to be derived from the fees.
- Allocation of public and private shares of project costs and allowable administrative costs, and establishment of the amount, schedule and collection of development fees.

As the District continues to grow and prosper, more cars, trucks and buses are expected on our roads. Meanwhile, train and bus ridership is also increasing along with the number of pedestrians and bicyclists. Our ability to deal with these demands at all levels of government is limited without a sound framework for developing responses to congestion and aging infrastructure problems, as well as for providing adequate funding to implement strategic solutions.

Utilizing the above provisions as a guide, this report presents solutions to the aforementioned problems through the first Meadowlands District Transportation Plan (MDTP or Plan). The purpose of this Plan is to establish policies and objectives in terms of needs and improvement priorities for all modes of transportation within the District for the ensuing 24 years. Additionally, the Plan will recommend proposed transportation projects designed to address

future development and its effects on local transportation infrastructure, the allocation of public and private shares of project costs and allowable administrative costs, and the amount, schedule and collection of development fees. With the implementation of the transportation improvements suggested in the Plan, existing local transportation infrastructure can be upgraded to handle future increases in volume of passenger and freight traffic, leading to the sustainability of the District over the next 24 years.

II. DEMOGRAPHIC AND TRANSPORTATION SYSTEMS

A. INTRODUCTION

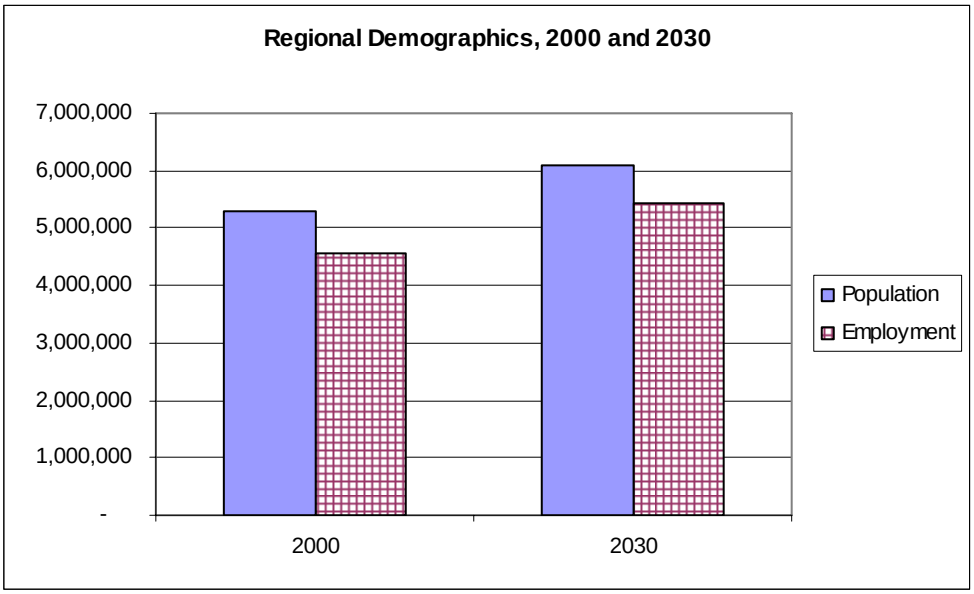
Understanding the impact of development on travel demand and transportation system performance is necessary to develop the Plan. To do so, NJMC assembled information on current and future demographic and transportation conditions and then simulated these factors in a regional transportation model to determine their effects.

B. DEMOGRAPHICS

1. Regional

In 2000, 5.3 million people lived in the North Jersey region (Hudson, Bergen, Passaic, Essex, Morris, and Union counties, along with New York County, NY), and the region supported 4.6 million jobs. Projections indicate that by 2030, the regional population will increase by about 774,000, or 15%, and the region will gain 863,500 jobs, a 19% increase (see Figure II-1).

Figure II-1: Existing and Future Demographics in the North Jersey Region



Sources: North Jersey Transportation Planning Authority (NJTPA) and New York Metropolitan Transportation Council (NYMTC).

2. District

Most of the non-residential development within the District involves warehousing and industrial uses. As of 2006, almost 60,000 of the nearly 87,000 jobs in the District were in these types of businesses. Office and retail businesses account for most of the other employment. Table II-1 shows the major employment centers (those with 2,500 or more employees).

Table II-1: Major Employment Centers in the Meadowlands District

Town	Area	Employees*
Teterboro	Industrial Avenue	10,500
Moonachie	Moonachie Avenue	3,000
Carlstadt	Washington Ave./Commercial Ave.	12,000
East Rutherford	NJ 17/Paterson Plank Road	4,800
Rutherford	NJ 17/NJ 3	3,000
Lyndhurst	Meadowlands Corporate Center	5,500
Kearny	Industrial area	2,700
Secaucus	Warehouse/Outlet area	15,000
Secaucus	Mill Creek Mall/Harmon Meadow	8,000
North Bergen	Westside Avenue	5,500

* Rounded numbers are based on traffic analysis zone (TAZ) data provided by the NJMC and included in the regional transportation model. See Appendix II-A for more details.

In 2006, the District also included 3,688 housing units with an estimated 8,482 residents. Table II-2 shows the major residential centers (those with 300 or more housing units).

Table II-2: Major Residential Centers in the Meadowlands District

Town	Area	Units *
Little Ferry	Mehrhof Road area	300
Moonachie	Moonachie Avenue	550
Secaucus	North Secaucus	650
Secaucus	Harmon Cove	600
Secaucus	County Avenue corridor	650

* Rounded numbers are based on traffic analysis zone (TAZ) data provided by the NJMC and included in the regional transportation model. See Appendix II-A for more details.

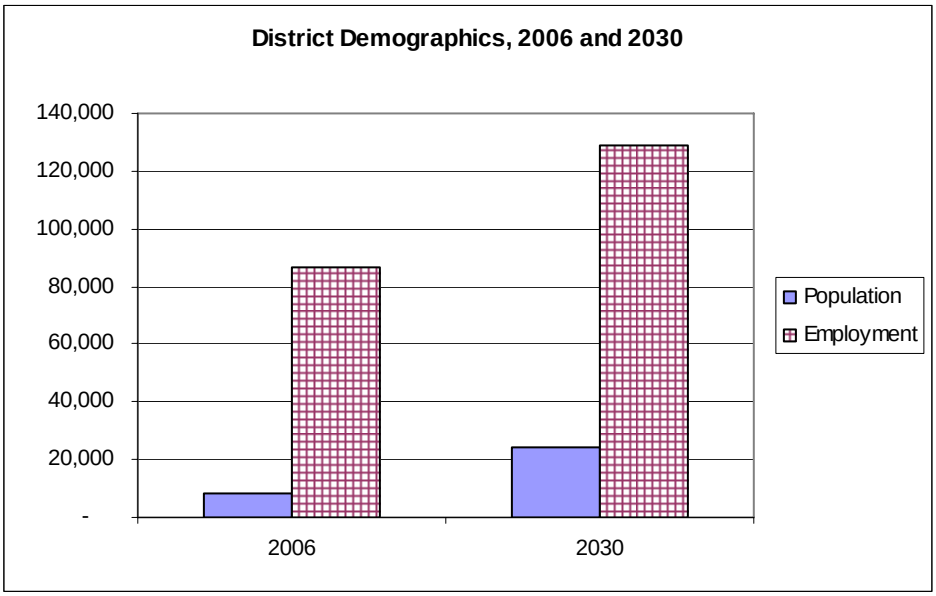
The NJMC also identified future construction development projects expected to occur by 2030. As a result of these projects, the District will grow substantially in both population and employment. More than 40,000 jobs will be added (an increase of about 48%), and the District will gain nearly 6,800 housing units and more than 15,000 people (increases of more than 180%). (See Table II-3 and Figure II-2.)

Table II-3: Current & Projected Housing, Population and Employment

	2006	2030	Increase Number	Increase %
Housing Units*	3,688	10,482	6,794	184%
Population**	8,482	24,109	15,627	184%
Employment	86,923	128,854	41,931	48%

* Based on traffic analysis zone (TAZ) data provided by the NJMC and included in the regional transportation model. See Appendix II-A for more details.
** Assumes 2.3 persons per unit.
Sources: NJMC model, NJMC development project data.

Figure II-2: Existing and Future Demographics in the Meadowlands District



Sources: NJMC model, NJMC development project data.

Table II-4 shows the major development projects anticipated for the District by 2030. Each project will generate more than 3,000 jobs or more than 2,000 dwelling units. Most of these projects will occur in redevelopment areas. These areas include Paterson Plank Road (in Carlstadt and East Rutherford), Highland Cross (in Rutherford), Kearny Area (in Kearny), and Secaucus Transit Village (in Secaucus). Some redevelopment will replace existing land uses, particularly warehousing. In addition, major new development will occur in the areas around the Meadowlands Sports Complex (Xanadu) and Secaucus Junction (Allied Junction).

The biggest increase in non-residential development will be for office space, particularly at Allied Junction, Xanadu, and the Highland Cross Redevelopment Area. Substantial growth in retail development could occur at a vacant Mori property (Block 227, Lot 9) adjacent to the Plaza at Harmon Meadow in Secaucus, Xanadu, and the Paterson Plank Road Redevelopment Area. In addition, warehouse space will increase substantially in the Kearny Redevelopment Area.

The projected new residential development will include apartments; low-rise, high-rise, and mid-rise condominiums/townhouses; and adult communities. The two major areas for new housing will be the Meadowlands Golf Redevelopment Area (EnCap) in Lyndhurst and Rutherford and the Secaucus Transit Village Redevelopment Area.

Table II-4: Major Future Development Projects in the Meadowlands District

Project	Town	Type
Xanadu	E. Rutherford	Office, retail, hotel
Allied Junction	Secaucus	Office, retail, hotel
Vacant Property (Block 227, Lot 9)	Secaucus	Retail
Kearny Redevelopment Area	Kearny	Warehouse, retail
Paterson Plank Road Redevelopment Area	Carlstadt, E. Rutherford	Retail, warehouse, office
Highland Cross Redevelopment Area	Rutherford	Office, hotel
Secaucus Transit Village Redevelopment Area	Secaucus	Residential, office, retail, hotel
EnCap Golf Redevelopment Area	Lyndhurst, Rutherford	Residential, retail, hotel

Source: NJMC development project data.

C. TRANSPORTATION SYSTEM

The District has an extensive transportation network, including roads, commuter rail, bus, rail freight, and pedestrian and bicycle facilities. This section describes the main transportation facilities and services that currently exist.

1. Public Transit

The District currently has several public transit services, including commuter rail, regional bus, local bus, and circulator/shuttle service. Some routes run through the District and primarily serve commuters to New York City. Other routes serve locations within the District. In addition, a few routes on the periphery of the District provide service to and from the District via connecting routes.

a. Commuter Rail

The following three NJ TRANSIT commuter rail lines directly serve the District (see Figure II-3):

- The Northeast Corridor Line provides service east to New York City and west to Newark, New Brunswick, and Trenton. Operations along the Northeast Corridor include Amtrak national rail service, NJ TRANSIT commuter rail lines, and trans-Hudson rapid transit service (PATH service) provided by the Port Authority of New York and New Jersey (along additional trackage on the right-of-way west of the New Jersey Turnpike). Northeast Corridor right-of-way widths within the District can accommodate as many as 6 tracks (at the Newark Drawbridge east of Newark Penn Station), and as few as two tracks (when crossing the Portal Bridge, west of Secaucus Junction). As many as 52 trains per hour use this right-of-way, making it one of the busiest rail corridors in the country.
- The Main Line/Bergen County Line runs between Suffern (NY) and Hoboken. In the District, it stops along the Main Line at Lyndhurst, Kingsland, and Secaucus Junction. The Bergen County Line, which branches off the Main Line at Ridgewood, stops at several stations, including Rutherford, before rejoining the Main Line just north of Secaucus Junction. Both the Main Line and Bergen County Line rights-of-way consist of two tracks each, allowing frequent operation of passenger rail service along each line, with 26 trains operating on weekdays between Port Jervis and Hoboken, and 72 trains operating on weekdays between Suffern and Hoboken. According to NJ TRANSIT in its Access to the Region's Core DEIS (dated February 2007), freight services are also run by Norfolk Southern (NS) along the Main and Bergen County Lines; however, these services are limited to a single overnight train between Croxton Yard and Campbell Hall (New York).

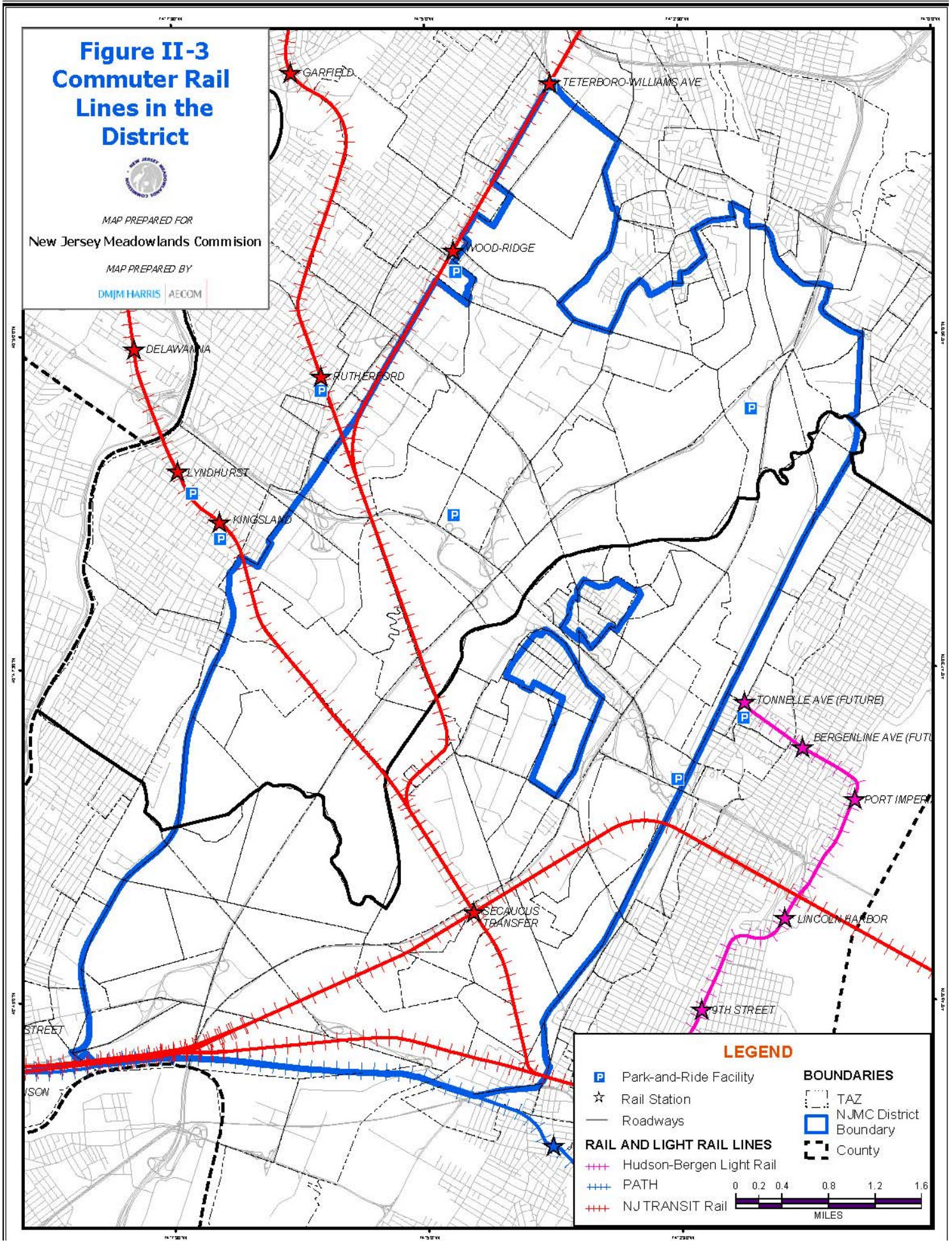


Figure II-3
Commuter Rail Lines in the District
MAP PREPARED FOR
New Jersey Meadowlands Commision
MAP PREPARED BY
DMJM HARRIS | AECOM
GARFIELD
TETERBORO-WILLIAMS AVE
WOOD-RIDGE
DELAWANNA
RUTHERFORD
LYNDHURST
KINGSLAND
TONNELLE AVE (FUTURE)
BERGENLINE AVE (FUTU
PORT IMPERI
SECAUCUS TRANSFER
LINCOLN HARBOR
9TH STREET
LEGEND
Park-and-Ride Facility
Rail Station
Roadways
RAIL AND LIGHT RAIL LINES
Hudson-Bergen Light Rail
PATH
NJ TRANSIT Rail
BOUNDARIES
TAZ
NJMC District Boundary
County
0 0.2 0.4 0.8 1.2 1.6
MILES

Table II-5: NJ TRANSIT Bus Routes in the Meadowlands District

Route	Service Area
2	Jersey City – County Road – Harmon Meadow – Secaucus Junction
39	North Arlington – Kearny – Irvington
40	North Arlington – Kearny – Elizabeth
43	Newark - Kearny – Jersey City
76	Newark – Kearny – Rutherford – Hackensack
78	Newark – Harmon Meadow - - Meadowland Parkway
83	Jersey City – Ridgefield – Hackensack
85	Hoboken – Harmon Meadow – Mill Creek Mall
124-129	NYC – Harmon Meadow – Hartz Way – Secaucus Junction
144-145-148-164	NYC – East Rutherford – Wood-Ridge – Midland Park
160	Elmwood Park – East Rutherford – NYC
161	Paterson – Moonachie – East Rutherford – NYC
163	NYC – East Rutherford – Wood-Ridge – Ridgewood
165	Westwood – Little Ferry - NYC
190	Paterson – Rutherford - Secaucus Plaza – NYC
191	Wayne – Lyndhurst – NYC
192	Clifton – Rutherford – Lyndhurst – NYC
195	Wayne – Lyndhurst – NYC
320	NYC – Harmon Meadow – Mill Creek
321	Vince Lombardi Park-and-Ride – NYC
351	NYC – Meadowlands Sports Complex
703	Haledon – East Rutherford – Moonachie
772	New Milford – Moonachie – Harmon Meadow – Secaucus Junction

Source: NJ TRANSIT.

Bus routes within the District feed into the major thoroughfares within the District, such as NJ 3, NJ 120, and NJ 495. As a result, high volumes of buses operate along these corridors during the morning and evening rush periods, as multiple regional and interstate NJ TRANSIT bus routes share the following stretches of limited-access highway:

- NJ 3 (between the Meadowlands Sports Complex and the New Jersey Turnpike)
- NJ 120 (between Paterson Plank Road and NJ 3).
- NJ 3/NJ 495 (between NJ 3 and Tonnelle Avenue).

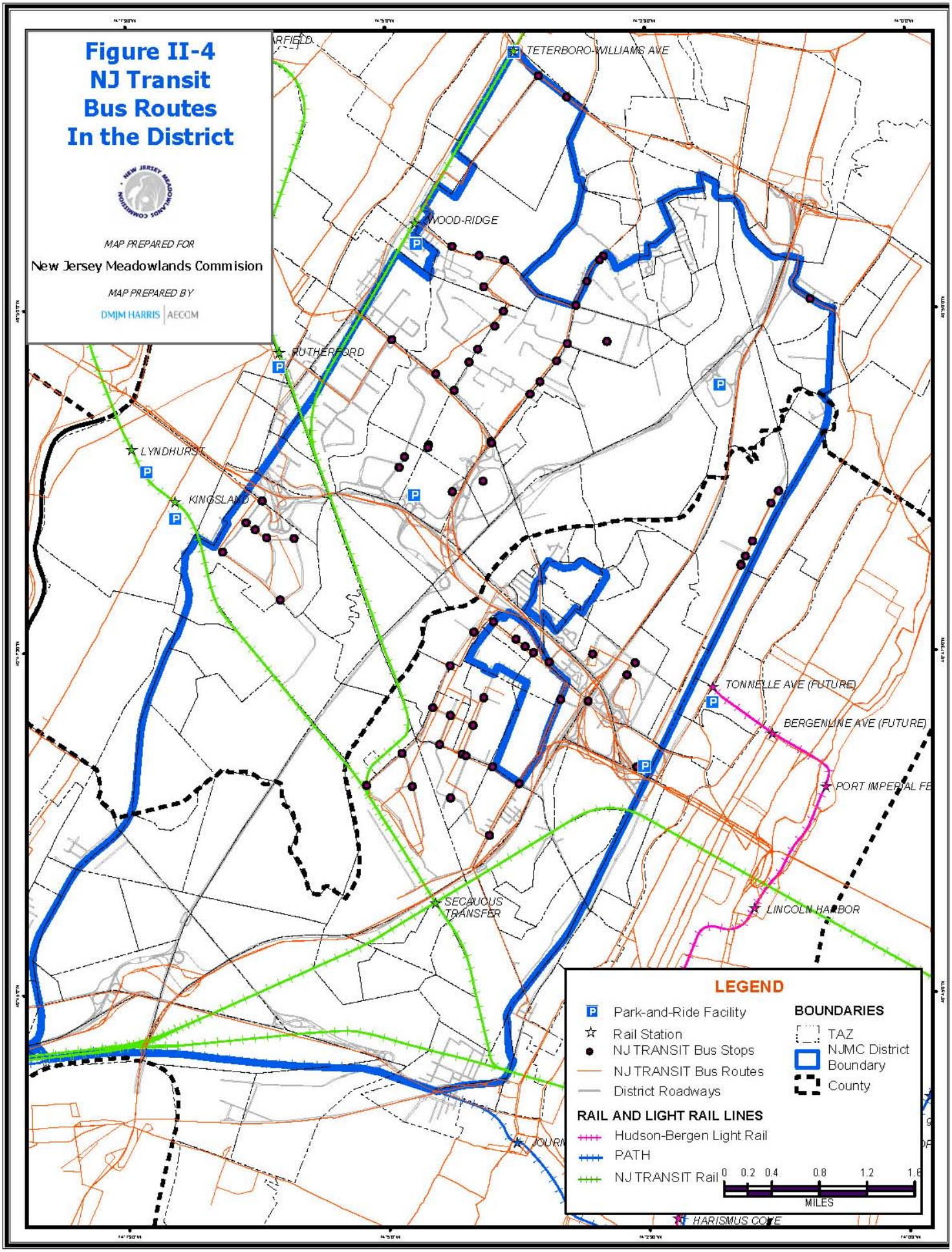


Figure II-4
NJ Transit
Bus Routes
In the District
MAP PREPARED FOR
New Jersey Meadowlands Commision
MAP PREPARED BY
DMJM HARRIS | AECOM
TETERBORO-WILLIAMS AVE
WOOD-RIDGE
RUTHERFORD
LYNDHURST
KINGSLAND
TONNELLE AVE (FUTURE)
BERGENLINE AVE (FUTURE)
PORT IMPERIAL FE
SECAUCUS TRANSFER
LINCOLN HARBOR
HARISMUS COVE
LEGEND
Park-and-Ride Facility
Rail Station
NJ TRANSIT Bus Stops
NJ TRANSIT Bus Routes
District Roadways
RAIL AND LIGHT RAIL LINES
Hudson-Bergen Light Rail
PATH
NJ TRANSIT Rail
BOUNDARIES
TAZ
NJMC District Boundary
County
0 0.2 0.4 0.8 1.2 1.6
MILES

NJ TRANSIT's Job Access/Reverse Commute (JARC) program supports supplemental service, sponsored by Hudson County, on some routes (#2, 85, and 129). This service helps low-income workers reach jobs in the Harmon Meadow area of Secaucus.

A few private bus lines also provide commuter service to New York City. DeCamp Route #32 runs between Manhattan, Lyndhurst, and Nutley; DeCamp Route #44-99 runs between New York City, Kearny, and Bloomfield; and Coach USA operates service between Manhattan, Secaucus, Carlstadt, and Suffern, NY. These private services also use major roadways, particularly NJ 3 and NJ 495, to travel to and from New York City.

c. Community Transit

Several circulator/shuttle services currently serve the District. The Meadowlink Transportation Management Association (Meadowlink) operates most of these services, which are oriented toward specific worksites. They include the following:

- Harmon Meadow-Secaucus Junction Shuttle (average daily ridership – 120). Service runs weekdays during the hours of 7:00 to 10:00 a.m. and 4:00 to 7:24 p.m. Tenants, employees, and the general public may use this shuttle.
- Jersey City Shuttle (average daily ridership - 63). Service runs between Journal Square and the Bank of New York in Lodi and the Federal Reserve Bank in East Rutherford. This fixed-route shuttle runs every 30 minutes on weekdays during peak commuting hours.
- Meadowlands Shuttle (average daily ridership – 64). Service runs between the Rutherford Station and the Meadows Office Complex and the Federal Reserve Bank in East Rutherford. The shuttle operates Monday through Friday during peak commuting hours.
- New York Night Shuttle (average daily ridership – 12). This weekday service transports late-shift employees of The Federal Reserve Bank and The Bank of New York who live in New York City. The shuttle departs from 42nd Street & Eighth Avenue in Manhattan.
- Metropolitan Center-Secaucus Junction Shuttle (average daily ridership – 120). This shuttle operates weekdays between the Secaucus Junction Station and the Metropolitan Center in East Rutherford. It is available for employees of the Metropolitan Center.

In addition, the Town of Secaucus operates shuttle service between Secaucus Junction and Mill Ridge Road & Koelle Boulevard. In addition, NJ TRANSIT's Access Link program provides van service for persons with disabilities. Each trip must begin and end within ¾ mile of a local bus route. In addition, Hudson and Bergen Counties both provide weekday paratransit service throughout their respective counties for older persons (age 60+) and disabled people.

d. Park-and-Ride Areas

Meadowlands Mobility 2030 provides information on "park-and-ride" areas within and near the District. These facilities primarily serve commuters to New York City. They currently include the following:

- Vince Lombardi Service Area Park-and-Ride along the NJ Turnpike in Ridgefield (1,000+ spaces)
- Lincoln Tunnel–North Bergen Park-and-Ride near the interchange of NJ 3 and NJ 495 in North Bergen (nearly 1,500 spaces)
- Meadowlands Park-and-Ride. The New Jersey Sports and Exposition Authority allows parking in Lots 9 and 11 on the west side of the stadium at the Sports Complex.

Some park-and-ride areas outside the District offer the potential to "intercept" commuters and reduce traffic through or into the District. These facilities include the following:

- Montclair State University station parking deck at the new station along the Montclair-Boonton Line (1,500 spaces)
- Willowbrook Park-and-Ride near the interchange of I-80 and US 46 (800 spaces)
- Areas along NJ 17 in northern Bergen County, including Ridgewood and Ramsey (1,000 spaces)
- River Edge and Essex Street stations (101 and 236 spaces, respectively) along the Pascack Valley Line in Hackensack
- Allwood Road Park-and-Ride in Clifton near the interchange of the Garden State Parkway and NJ 3 (695 spaces).

Several other stations along commuter rail lines north of the District provide parking areas for potential use by commuters traveling through or into the District. One project under construction is a new facility that will provide about 1,000 spaces along NJ 23 in Wayne.

e. Committed NJ TRANSIT Projects

In addition to existing services, NJ TRANSIT has committed to the following future public transit improvement projects:

- Access to the Region's Core/THE Tunnel. NJ TRANSIT has initiated preliminary engineering for the new Trans-Hudson Express (THE) commuter rail tunnel under the Hudson River between New Jersey and midtown Manhattan. NJ TRANSIT anticipates that the tunnel and related improvements to tracks, stations, and storage facilities will double trans-Hudson rail capacity to meet the projected 2025 demand.
- Sports Complex Rail Spur, Phase 1. This 2.3-mile two-track rail spur off the Pascack Valley Line will connect to a new station near the new Meadowlands stadium, racetrack, and proposed Xanadu entertainment/retail complex. The planned service will start in Hoboken and include a stop at Secaucus Junction. Construction is underway, and the service will start in 2008.
- Pascack Valley Line Passing Siding Improvements. These passing siding tracks and new signals will enable off-peak service in both directions. The project will increase capacity to accommodate increased demand for service to both Secaucus Junction and the Meadowlands Sports Complex. NJ TRANSIT anticipates that the project will be complete in fall 2007.
- Northern Branch. The Hudson-Bergen Light Rail line (HBLR) provides service between North Bergen, Hoboken, Jersey City, and Bayonne. NJ TRANSIT has completed a draft Environmental Impact Statement (DEIS) to extend the HBLR through Bergen County and into Tenafly. (Its current northern terminus is at Tonnelle Avenue in North Bergen, just outside the District boundary.) This project will reactivate passenger service on the Northern Branch rail line using self-propelled "diesel multiple-unit" (DMU) railcars. A proposed second phase would involve constructing a link with THE Tunnel deep within the Palisades, allowing for direct commuter rail service (a one-seat ride) to midtown Manhattan.

2. Roads

a. Interstate Highways

The New Jersey Turnpike/I-95 is a major north-south arterial that connects the District with the entire eastern coast of the US. For most of its length within the District (about 9 miles), the NJ Turnpike comprises an eastern spur and western spur – roadways separated by as much as 1 ½ miles. The Turnpike interchanges within the District provide connections with I-280, Secaucus Junction, NJ 3, and the Lincoln Tunnel.

I-280 runs east-west for about 1.5 miles within the District. It connects the NJ Turnpike in the southern part of the District with Newark and other areas to the west, eventually terminating at I-80 in Morris County.

b. State Highways

The following state highways serve the District:

- US 1&9, a north-south highway, is located just outside the southern and eastern boundaries.
- NJ 3 is a key east-west freeway, bisecting the District. It runs for about 4.5 miles in the District, connecting points west with I-495 and the Lincoln Tunnel.
- NJ 7 runs east-west for about 3.5 miles in the District, connecting Jersey City with Kearny and North Arlington and extending into Essex County.
- NJ 17 is a north-south roadway that runs mostly just west of the District's boundary. It intersects with NJ 7 and NJ 3 and eventually terminates at I-287 at the New York state border.
- US 46 runs east-west along and just to the north of the District's boundary. It provides a connection between the northern part of the state and the George Washington Bridge.
- NJ 120 extends for 2.7 miles from NJ 3 at NJ Turnpike Exit 16W in the District around the Sports Complex to NJ 17.
- NJ 495 is a short east-west expressway that runs for about .8 miles within the District and connects the NJ Turnpike and NJ 3 with the Lincoln Tunnel.

c. Local Roads

Several county and municipal roads also play important roles in the transportation network. Key local roads include the following:

- Washington Avenue/Moonachie Road is a county road that extends north from Paterson Plank Road and serves employment centers in Carlstadt and Moonachie.
- Paterson Plank Road in North Bergen and Secaucus is a county and municipal road that runs between US 1&9 and the Hackensack River and serves commercial and residential areas.
- County Road is a county road that runs between US 1&9 and County Avenue and provides access to the warehouse/outlet district in Secaucus.
- County Avenue is a county road that connects Paterson Plank Road and the downtown area of Secaucus with the Secaucus Junction area.
- New County Road is a county road that connects County Road and County Avenue with the Secaucus Transit Village Redevelopment Area.
- Meadowland Parkway is a municipal road that connects NJ 3 with the Secaucus warehouse/outlet district and Secaucus Junction.
- Secaucus Road is a county and municipal road that runs between US 1&9, the warehouse/outlet district, and Meadowland Parkway.
- Moonachie Avenue is a county road that connects NJ 17 and Washington Avenue, and provides access to residential and commercial areas in Moonachie and Carlstadt.
- The Newark–Jersey City Turnpike/Harrison Avenue is a county road that links employment areas in Kearny with points east and west.
- Westside Avenue is a municipal road that extends north from Paterson Plank Road and serves employment centers in North Bergen.

d. Future Road Improvements

The New Jersey Department of Transportation's (NJDOT's) and the NJTPA's transportation improvement programs include several projects for the District by the year 2030. In its analysis of travel conditions in 2030, this Plan assumes that these projects will be complete or "committed."

Many of these committed roadway projects are in the area of the Sports Complex. For the Xanadu project, the developers reached an agreement with the NJDOT, the NJ Turnpike Authority, and the NJSEA to provide $71 million worth of roadway improvements. These improvements include reconfiguring the NJ 3 & NJ 120 interchange, constructing a new NJ 3 flyover and related ramps, widening Paterson Plank Road in Carlstadt/East Rutherford from four to six lanes, widening and intersection improvements along Paterson Plank Road at Murray Hill Parkway and Gotham Parkway, and other NJ 120 and Paterson Plank Road improvements.

In addition, a few projects will occur in conjunction with the Meadowlands Rail and Road Improvement Project. These projects involve re-aligning the intersection of Paterson Plank Road & Berry's Creek Road (which provides access to the sports complex) and making improvements to NJ 120 southbound and to ramps connecting with the internal stadium roadways.

Three NJ Turnpike interchange improvement projects have also received approved construction funding:

- A new toll plaza at Exit 18W and ramping modifications that will provide direct access from the NJ Turnpike's western spur to the Sports Complex, Xanadu, and Paterson Plank Road/NJ 120
- Improvements to Exit 16W, westbound NJ 3, and other nearby roads
- Construction of two additional entry lanes at Exit 16E/18E.

Planned improvements to NJ 3 include replacing the NJ 3 bridge over the Passaic River. This project will also provide shoulders and standard acceleration and deceleration lanes to enable vehicles to safely enter and exit the highway. The project also includes replacing several other bridges and adding 12-foot auxiliary lanes in both directions.

Several projects also are anticipated in the US 1&9 corridor:

- Replacing the existing St. Paul's Viaduct with a new structure, providing direct connections between US 1&9 Truck, NJ 7 Wittpenn Bridge, Pulaski Skyway, NJ 139, and local streets
- Replacing the existing movable Wittpenn Bridge, which carries NJ 7 across the Hackensack River between Jersey City and Kearny, with a vertical lift bridge
- Reconfiguring the Charlotte and Tonnelle circles
- Replacing the existing NYS&W railroad bridge with a new bridge, including shoulders and sidewalks
- Completing various corridor improvements along US 1&9 between Secaucus Road and Fairview Avenue. These improvements include pavement reconstruction, widening and upgrading the roadway section to current standards, drainage system improvements, new sidewalks, increased lane widths, and replacing and upgrading all traffic signals and curb ramps to comply with ADA requirements

Appendix II-B provides more details on these and other committed roadway projects.

3. Pedestrian and Bicycle Facilities

According to the NJMC *Master Plan*, pedestrian and bicycle paths are limited in the District because of the concentration of industrial and commercial land uses and the number of heavily traveled roads.

Sidewalks in the District vary in availability and condition. In general, older industrial/warehouse areas have fewer and more poorly maintained sidewalks, while sidewalks are in better condition in newer office/commercial developments.

The District currently has only two designated on-street bicycle routes (both are located in East Rutherford). The first route runs along East Union Avenue between Dubois Street and Berry's Creek, and the other runs along Murray Hill Parkway between East Union Avenue and Paterson Plank Road. The layouts of both routes are identical, consisting of lanes marked for bicycle usage along both curb lines. All bicycle lanes along these routes are designated for automobile parking as well.

The District has two existing trail routes: the Secaucus Greenway and the Meadows Path. Both routes have complete and incomplete portions. Plans are for the Secaucus Greenway to extend for 15 miles between Secaucus and Jersey City and link parks and recreational facilities with retail, commercial, and residential areas. Complete portions of the greenway include a 1.5-mile trail through the Mill Creek Marsh and trails within the Laurel Hill County Park west of Secaucus Junction.

The Meadows Path is planned to extend for more than 25 miles between Kearny and Little Ferry on the west shore of the Hackensack River. The trail will connect existing sidewalks, trails, parks, residential areas, and bus stops. Complete portions include the following:

- .5 miles through Losen Slote Creek Park in Little Ferry
- 2.25 miles through DeKorte Park
- 1.5 miles along Valley Brook Avenue between DeKorte Park and Meadowlands Corporate Center
- 1.1 miles along the Saw Mill Creek Trail

The East Coast Greenway may provide another trail through the District. Its proposed path would follow the Bergen Arches from Jersey City and an east-west path across Secaucus and Kearny in the southern part of the District.

D. TRANSPORTATION SYSTEM PERFORMANCE

The main tool for evaluating transportation District-wide system performance is a regional transportation model. A transportation model uses development quantities by traffic analysis zones (TAZ) to calculate the number of trips that are generated, assign these trips to the roadway and transit network, and evaluate traffic flow along the network. This study process involved refining the regional transportation model recently developed by various NJMC consultants and then using the enhanced model to assess current and future travel conditions in the District. The refined NJMC regional model uses inputs in the form of population and employment data, both current (2006) and forecast to the year 2030, allocated across sub regional geographic areas called transportation analysis zones (TAZs). Additional inputs reflect

the roadway network and transit service share of travel. From these inputs, the model determines the amount of travel (measured in vehicle trips) in the region, the points of origin and destination for these trips and the travel path on the network the trips will follow. In determining the trip paths on the network, the competition for the use of roadway segments is taken into account such that a level of balance across the network results. The impact of this travel is the basis for evaluating levels of current and future congestion and investigating treatments to address these levels of congestion. Chapter III and Appendices III-B1, III-B2 and III-B3 provide technical details on the use of the model in the detailed assessment of transportation system improvement needs based on the model analysis.

The analysis used the model to evaluate evening peak period travel conditions under the land use and transportation scenarios shown in Table II-6. The system performance outputs from these scenarios provided the basis for assessing transportation system improvement needs and estimated costs. They also provided the basis for preparing the fee assessment framework and calculations.

The model provides system-wide outputs for indicators such as the number of vehicle miles traveled (VMT), vehicle hours traveled (VHT), and the percentage of lane miles in congestion for each scenario. The model identifies congested roadway segments as those having a volume-to-capacity (V/C) ratio of greater than 0.9.

Table II-6: Modeling Scenarios

Scenario	Year	Land Use	Transportation
Current	2006	Existing conditions	Existing system
Current plus Committed	2006	Existing conditions	Existing system plus committed projects
Build	2030	Existing conditions and future development	Existing system plus committed projects
Build plus Transit	2030	Existing conditions and future development	Existing system, committed projects, and proposed transit service enhancements

Table II-7 and Figure II-5 summarize overall regional system performance under each scenario. The data shows that under current conditions some District roads experience peak period congestion, defined as having a V/C ratio greater than 0.9, with 30% of lane miles congested. For the Current plus Committed scenario, the analysis shows that adding the committed transportation improvement projects would have limited impact on system performance. The percentage of congested lane miles decreases only slightly to 26%, due to the current high V/C ratios on certain segments and the location and amount of re-allocated traffic volumes relative to these segments.

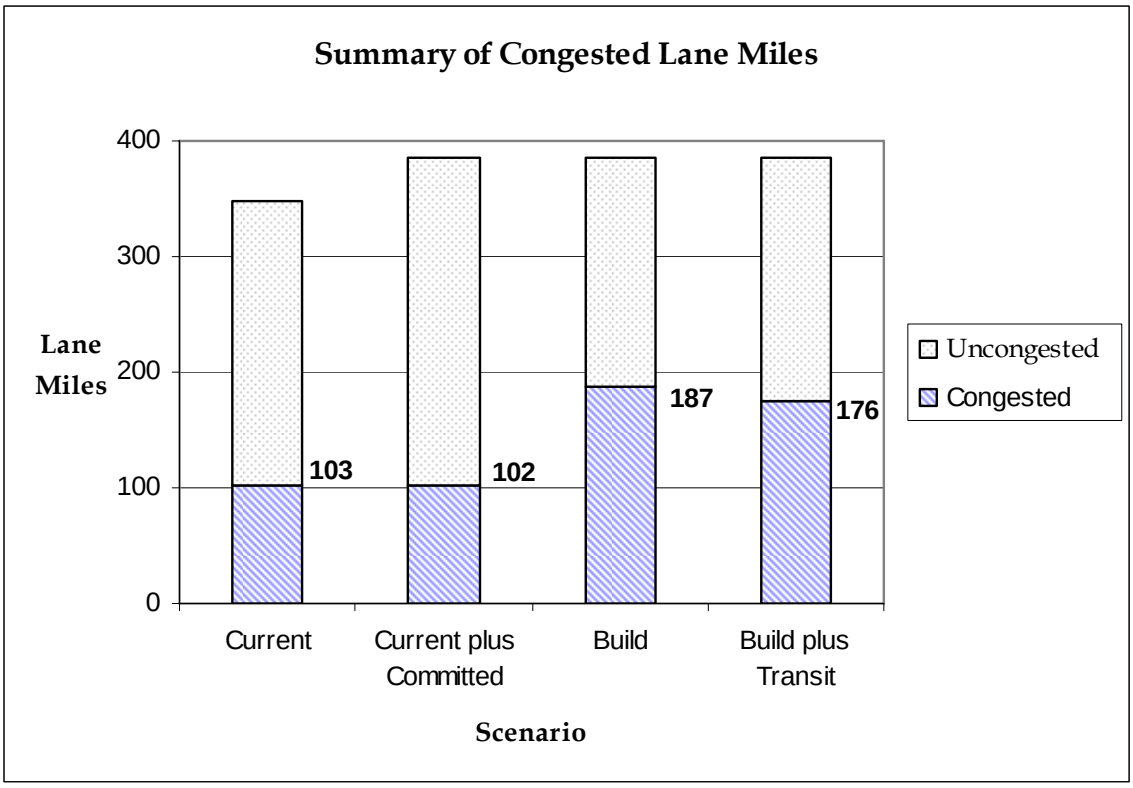
The projected development under the 2030 Build scenario would result in a substantial increase in roadway congestion. Vehicle miles traveled, for the PM peak period, would be 36% higher than under existing conditions, and the percentage of congested lane miles would increase to 48%. Finally, adding the proposed transit service enhancements for the Build plus Transit scenario would have almost no impact on travel conditions – the percentage of congested lane mile would be 45%. These modeled future travel performance levels on the roadway network are the platform upon which candidate improvements to address locations experiencing unacceptable performance are identified, tested and budgeted in Chapters III and IV.

Table II-7: Summary of Model Analysis

	Current (2006)	Current plus Committed	Build (2030)	Build plus Transit
Lane miles	348	386	386	386
VMT (miles)	1,433,272	1,493,684	1,947,970	1,948,858
Average speed (mph)	27.5	28.7	21.0	21.0
VHT (hours)	58,663	58,839	125,593	124,755
Congested lane miles (V/C>0.9)	103	102	187	176
% Congested lane miles	30%	26%	48%	46%

Source: NJMC model

Figure II-5: Summary of Model Analysis



Source: NJMC model

In addition to the regional simulation model, two other tools were used to gauge current and future performance at the micro level in the District. Synchro, a micro simulation traffic model, was applied to selected intersections. The Highway Capacity Software was used to evaluate major interchanges. The results of these analyses are presented in Chapter III.

III. CANDIDATE IMPROVEMENTS

A. INTRODUCTION

Faced with the challenges identified in Chapter II, the NJMC began to identify both the needs and the opportunities for improving travel in the District under the forecast 2030 conditions. Based on the level, location, and type of current development and anticipated growth in the District, the NJMC identified potential system changes to improve travel performance across all modes. In every case, the analysis and the proposed improvements are oriented toward enhancing the network and services already existing or programmed for addition to the system. The candidate improvements would increase the connectivity of the network, both within single modes and among them, and mitigate pinch-points or bottlenecks; they are not new capacity additions. Regardless, several of the candidate improvements are major in scale, as are their costs.

The candidate improvements identified for potential inclusion in this Meadowlands District Transportation Plan are the result of either system-wide planning analyses or location-specific analyses. While each proposal addresses an identified travel need or opportunity, the identified improvements are conceptual and subject to further analysis, evaluation and refinement. More detailed information and analyses conducted during project development and/or environmental assessment may suggest alternatives to meet the intended objective. As alternatives are considered, benefits and consequences/impacts must be evaluated before the appropriate specific project can be selected for design and implementation. Each improvement is identified at a sufficient level of detail to estimate costs, but the estimated costs (see Chapter IV) are preliminary, and actual costs would be estimated anew after the refinement along the project development process and, therefore, cannot be known at this time.

The following sections of Chapter III discuss the methodology, findings, and candidate improvements for each mode in the District.

B. PUBLIC TRANSIT

Efficient public transit is the most important element for providing effective multi-modal travel options within the Meadowlands District. The first step in preparing the Meadowlands District

Transportation Plan was to review existing public transit services and determine opportunities to improve that service.

1. Existing Public Transit Service

As Chapter II noted, today the Meadowlands District is served by various public transit services. These services include regional bus routes, local bus routes and regional commuter rail lines provided by NJ TRANSIT, and other private and community transit operations.

2. Future Committed Projects

The NJMC has also identified several public transit improvement projects that NJ TRANSIT considers as "committed" for 2030. These committed improvements were included in the transportation network for modeling purposes:

- Trans-Hudson Express – new rail tunnel under the Hudson River
- Meadowlands Sports Complex Rail Spur – Phase I
- Northern Branch diesel multi-unit (DMU) train service between Tonnelle Avenue in North Bergen and Tenafly
- Pascack Valley Line passing siding improvements

3. Analysis Methodology

The process of determining transit needs for the District differs from the process used for roadways. Roadway needs are primarily driven by demand for capacity, but determining transit needs considers opportunities to provide transit as a viable alternative mode of transportation, based largely on favorable land use densities and other characteristics that support transit service. Thus, for the purpose of developing this plan, transit needs derive from goals such as improved connectivity, accessibility, and circulation and are not based on projected ridership between specific markets. For this reason, candidate transit improvements have not been categorized as satisfying existing and future needs. Instead, they represent an ongoing opportunity to improve transit options for the District – today and in the future. The transit improvement analysis focused on providing local transit connectivity between areas of housing and employment concentration and nodes of regional transit services (rail stations). The analysis also emphasized providing better local circulation options within the District.

The process for identifying public transit improvements started with assembling existing (2006) demographic data and future 2030 demographic projections by traffic analysis zone (TAZ). The analysts then applied NJ TRANSIT's Transit Score Index formula to calculate the Transit Score for each TAZ. The Transit Score is a measure of the feasibility of various types of public transit services, ranging from commuter rail to shuttle buses. It is based on household and population density, 0-vehicle and 1-vehicle household density, and employment density. Zones with a higher Transit Score have a greater transit potential than do zones with a lower score, and a higher score means that a broader range of services is feasible. Figure III-1 shows the 2030 Transit Scores by TAZ in the District. Appendix III-A displays the Transit Score analysis details by traffic analysis zone for the 2006 existing conditions, as well as the 2030 build conditions.

After calculating the 2030 Transit Scores by TAZ, the next step was to organize the District into sub-areas containing concentrations of relatively high Transit Scores so that existing services, can be analyzed, leading to a determination of potential new services. By identifying geographic groupings of TAZs with higher Transit Scores, the analysis established sub-areas for assessing potential improvements. The sub-areas are Kearny, Secaucus, Lyndhurst/Rutherford, and Carlstadt/Moonachie.

This effort reviewed existing and committed services to provide connectivity between regional transit stations/stops with key residential and employment clusters. The study considered the following types of service enhancements:

- Shuttle service to and from commuter and light rail stations
- Extended/revised bus routes
- New bus stops
- Increased bus frequency
- Local circulator service
- Bicycle and pedestrian connections

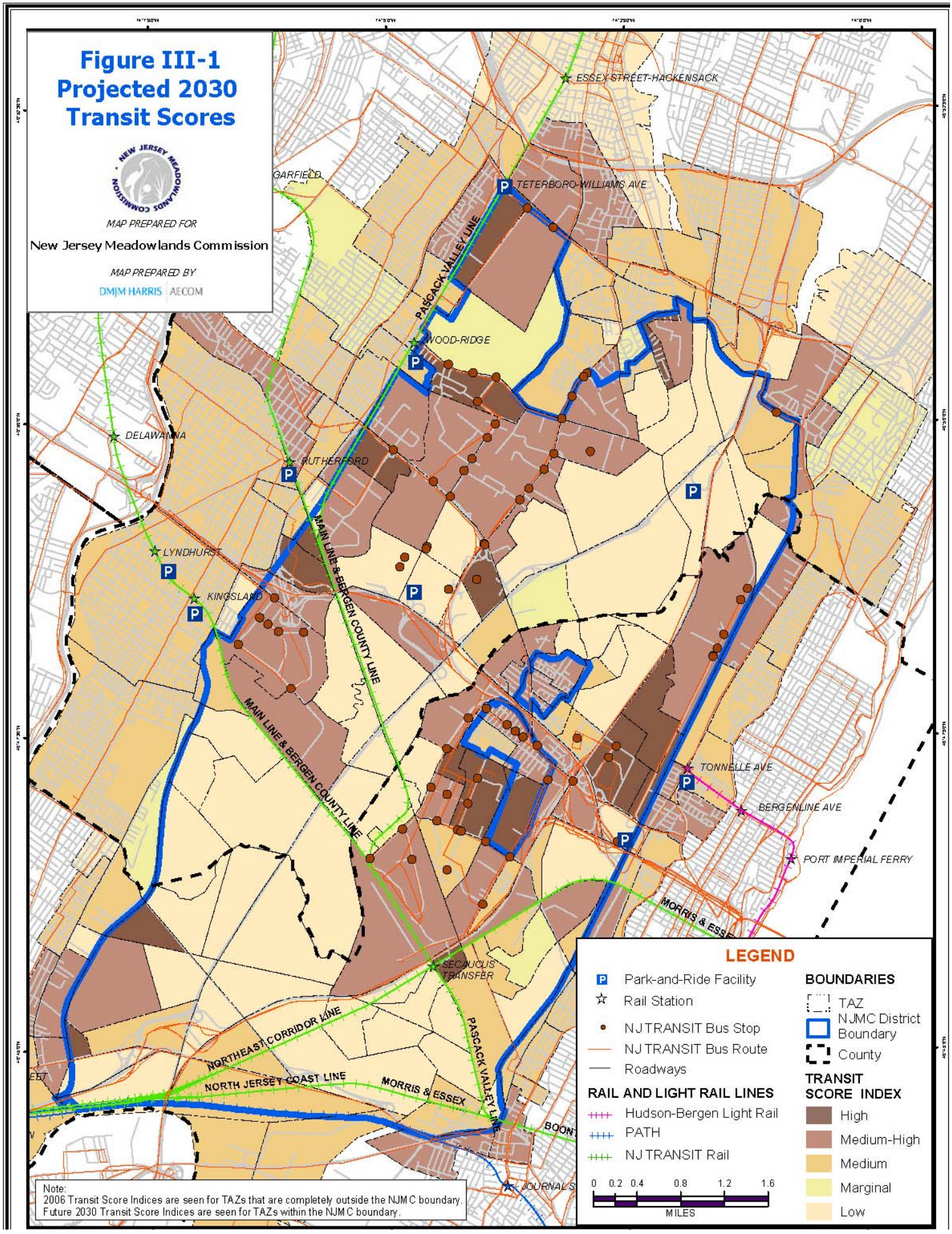


Figure III-1
Projected 2030
Transit Scores
MAP PREPARED FOR
New Jersey Meadowlands Commission
MAP PREPARED BY
DMJM HARRIS | AECOM
ESSEX STREET-HACKENSACK
GARFIELD
TETERBORO-WILLIAMS AVE
PASCACK VALLEY LINE
WOOD-RIDGE
DELAWANNA
RUTHERFORD
LYNDHURST
KINGSLAND
MAIN LINE & BERGEN COUNTY LINE
MAIN LINE & BERGEN COUNTY LINE
TONNELLE AVE
BERGENLINE AVE
PORT IMPERIAL FERRY
SECAUCUS TRANSFER
NORTHEAST CORRIDOR LINE
NORTH JERSEY COAST LINE
MORRIS & ESSEX
PASCACK VALLEY LINE
JOURNAL S
LEGEND
Park-and-Ride Facility
Rail Station
NJ TRANSIT Bus Stop
NJ TRANSIT Bus Route
Roadways
RAIL AND LIGHT RAIL LINES
Hudson-Bergen Light Rail
PATH
NJ TRANSIT Rail
BOUNDARIES
TAZ
NJMC District Boundary
County
TRANSIT SCORE INDEX
High
Medium-High
Medium
Marginal
Low
0 0.2 0.4 0.8 1.2 1.6
MILES
Note:
2006 Transit Score Indices are seen for TAZs that are completely outside the NJMC boundary.
Future 2030 Transit Score Indices are seen for TAZs within the NJMC boundary.

As a result of this work, the following transit improvements are proposed:

- Instituting the use of shuttle buses to circulate riders within the identified sub-areas throughout the District, connecting major places of employment, shopping, and recreation with existing and proposed residential development within the District.
- Providing/improving multi-modal connections to regional rail stations within the District.
- Minor extension/re-routing of an existing bus route (Route #76) to serve the major employment concentration in the Paterson Plank Road Redevelopment Area.

4. Candidate Improvements

The following summarizes the identified transit service enhancements by sub-area.

a. Kearny (Improvement T-1)

A bus shuttle route connecting Newark Penn Station to the Kearny Redevelopment Area and the Belleville Turnpike Redevelopment Area would improve travel in this sub-area. Opportunities exist for multi-modal connectivity to numerous rail transit services along this shuttle route. At Newark Penn Station, connections are available to many NJ TRANSIT commuter rail lines, PATH, Amtrak, and Newark Light Rail. At Harrison Station (located along Frank E. Rodgers Boulevard), connections can be made to PATH as well. An opportunity also exists to provide a rail intermodal interface at a proposed Bergen Avenue commuter rail station along a re-opened Harrison Kingsland rail line, scheduled to be implemented by NJ TRANSIT between 2010 and 2013.

Bus multi-modal connectivity can also be achieved through transfers to a significant number of local, express, and regional NJ TRANSIT and private bus lines at Newark Penn Station and at PATH's Harrison Station. In addition, the shuttle bus route would provide transfer points to existing NJ TRANSIT bus service along the Newark Turnpike/Newark-Jersey City Turnpike (Routes #40, 43). This shuttle service would allow riders to "flag" a bus at any participating development along the route to get on or off the shuttle.

b. Lyndhurst/Rutherford (Improvement T-2)

For this sub-area, a proposed circulator bus shuttle route would serve the EnCap Golf and Highland Cross redevelopment areas. Buses on this route would provide multi-modal connectivity with NJ TRANSIT commuter rail through direct connections at Kingsland Station and the proposed future EnCap Golf Station. Connectivity to existing NJ TRANSIT bus routes would also be available at the corner of Ridge Road and Rutherford Avenue (Route #191 and #192), at the corner of Polito Avenue and Rutherford Avenue (Route #76, #190, #191, #192 and #195), along Wall Street West and Chubb Avenue (Route #76), and at the corner of Veterans Boulevard and Borough Street (Route #163).

The circulator route also would provide additional transit accessibility to existing major employers along Valley Brook Road, Chubb Avenue, and Wall Street West, located adjacent to the EnCap Golf Redevelopment Area. In addition to the transfer points described above, riders could "flag" the shuttle at any participating development along the route to get on or off.

c. Secaucus (Improvements T-3, T-4, T-5)

A series of candidate shuttle bus routes would serve the proposed Transit Village at Secaucus Junction, the warehouse/outlet district of Secaucus, downtown Secaucus, and North Bergen. The Transit Village Shuttle Loop (Improvement T-3) at Secaucus Junction would connect with NJ TRANSIT buses at the corner of New Castle Road and Castle Road (Route #772), the corner of Castle Road and Meadowland Parkway (Route #129), and the corner of Meadowland Parkway and Seaview Avenue (Route #78).

The Secaucus Shuttle Loop (Improvement T-4) would connect with NJ TRANSIT buses at the corner of Metro Way and Enterprise Avenue South (Route #78) and along Secaucus Road (Routes #2, 124 and 772). Besides these transfer points, riders could "flag" all three shuttles at any participating development along the routes.

The North Bergen-Secaucus Junction Shuttle (Improvement T-5) would provide multi-modal connectivity between the NJ TRANSIT Hudson-Bergen Light Rail service and NJ TRANSIT buses (Routes #83 and 137) via a direct station stop at Tonnelle Avenue in North Bergen. It

would also connect with various commuter rail trains and NJ TRANSIT buses (Routes # 2, 129, 160, 163, 164 and 703) at Secaucus Junction. NJ TRANSIT bus connectivity on this shuttle loop would also be provided via transfers at the North Bergen Park-and-Ride (west of Tonnelle Avenue – Route #83), at stops located at Plaza Center (Routes # 2, 129 and 190), and along County Avenue (Routes #2, 78, and 772). This shuttle would connect with the other two Secaucus shuttles, Improvements T-3 and T-4.

d. Carlstadt/Moonachie (Improvement T-6)

For this sub-area, the proposed transit service enhancements would involve minor revisions to existing bus service. These revisions include routing NJ TRANSIT's Route #76 Meadowlands Service to serve major employment sites in the Paterson Plank Road area and the Wood-Ridge Station on the Pascack Valley Line. This would include providing Route #76 with a new bus stop along Industrial Road in the area of the Teterboro Station on the Pascack Valley Line.

In addition, a circulator bus shuttle route would serve the Paterson Plank Road Redevelopment Area and nearby industrial employers in Carlstadt and Moonachie. This route would provide connectivity between Pascack Valley Line commuter rail trains at the existing Wood-Ridge Station and a proposed NJ TRANSIT station directly north of Paterson Plank Road. Connections with NJ TRANSIT's buses could be achieved along this route via transfers along Moonachie Avenue (Routes #703 and 772), Moonachie Road (Route #772), and various bus routes along Route 17. As with the other proposed shuttles, riders could "flag" this shuttle at any participating development along the route to get on or off the bus.

5. Anticipated Benefits

Each of these short-term improvements could be implemented with ease on existing roadways with support from Meadowlink in marketing and promoting travel demand management. The new shuttle bus services would provide cost-effective and timely solutions to future transit needs by producing the following benefits:

- Multi-modal connectivity between local and regional bus service and commuter rail
- Individualized service to existing large employment centers and proposed multi-use redevelopment areas that are currently less accessible to bus or rail transit

- Shorter trip times for bus riders through transit route streamlining
- Congestion relief on major thoroughfares in the District through increased multimodal connectivity.

6. Private Bus Circulators

Two other development-specific shuttle bus circulators are also proposed in the District. These circulators would be a responsibility of the respective private/public developments served and are not considered in the transit improvement cost analysis. One circulator loop is proposed for the Harmon Meadows retail center in Secaucus. The North Bergen-Secaucus Junction Shuttle Loop would connect to this loop, thus facilitating access to the Harmon Meadows retail center from the Tonnelle Avenue Light Rail Station as well as the Secaucus Junction Train Station. The other circulator loop is proposed for the Meadowlands Sports Complex and Xanadu development. The Sports Complex Rail Spur would connect to this loop, thus facilitating access via regional rail lines. Figure III-2 is a map of all identified transit improvements within the District, including the two private routes, but numbering only those proposed for inclusion in the schedule of improvements.

Chapter IV presents planning-level cost estimates for these improvements. Additional analysis will be necessary to develop the operations of these services, including how they will be coordinated with existing transit services, particularly at stations and stops. The modeling analysis assumed the periods of operation and headways for the shuttle services shown in Table III-1 below. The headways (service frequencies) have been determined from a preliminary review of journey-to-work and modal split data available from the US Census.

Table III-1: Operations of Proposed Shuttles

REF #	Service	Period of Operation	Headway
T-1	Kearny Shuttle	4-hr AM peak and 4-hr PM peak	15 minutes
T-2	Lyndhurst Shuttle	4-hr AM peak and 4-hr PM peak	20 minutes
T-3,4,& 5	Secaucus Shuttles (all 3)	4-hr AM peak and 4-hr PM peak	10 minutes
T-6	Carlstadt/Moonachie Shuttle	4-hr AM peak and 4-hr PM peak	15 minutes

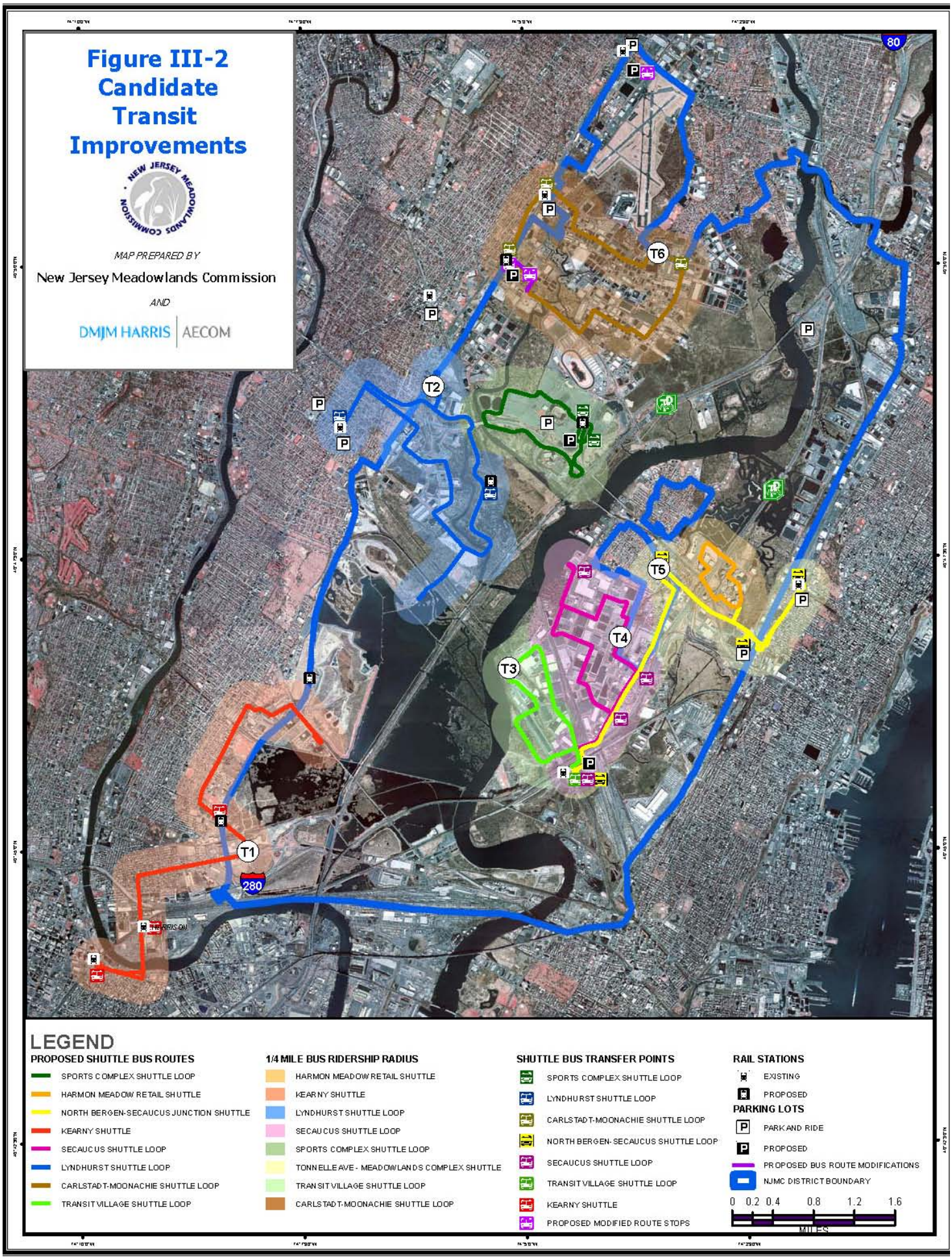


Figure III-2
Candidate
Transit
Improvements
NEW JERSEY MEADOWLANDS COMMISSION
MAP PREPARED BY
New Jersey Meadowlands Commission
AND
DMJM HARRIS | AECOM
80
T1
T2
T3
T4
T5
T6
280
HARRISON
LEGEND
PROPOSED SHUTTLE BUS ROUTES
SPORTS COMPLEX SHUTTLE LOOP
HARMON MEADOW RETAIL SHUTTLE
NORTH BERGEN-SECAUCUS JUNCTION SHUTTLE
KEARNY SHUTTLE
SECAUCUS SHUTTLE LOOP
LYNDHURST SHUTTLE LOOP
CARLSTADT-MOONACHIE SHUTTLE LOOP
TRANSIT VILLAGE SHUTTLE LOOP
1/4 MILE BUS RIDERSHIP RADIUS
HARMON MEADOW RETAIL SHUTTLE
KEARNY SHUTTLE
LYNDHURST SHUTTLE LOOP
SECAUCUS SHUTTLE LOOP
SPORTS COMPLEX SHUTTLE LOOP
TONNELLE AVE - MEADOWLANDS COMPLEX SHUTTLE
TRANSIT VILLAGE SHUTTLE LOOP
CARLSTADT-MOONACHIE SHUTTLE LOOP
SHUTTLE BUS TRANSFER POINTS
SPORTS COMPLEX SHUTTLE LOOP
LYNDHURST SHUTTLE LOOP
CARLSTADT-MOONACHIE SHUTTLE LOOP
NORTH BERGEN-SECAUCUS SHUTTLE LOOP
SECAUCUS SHUTTLE LOOP
TRANSIT VILLAGE SHUTTLE LOOP
KEARNY SHUTTLE
PROPOSED MODIFIED ROUTE STOPS
RAIL STATIONS
EXISTING
PROPOSED
PARKING LOTS
PARK AND RIDE
PROPOSED
PROPOSED BUS ROUTE MODIFICATIONS
NJMC DISTRICT BOUNDARY
0 0.2 0.4 0.8 1.2 1.6
MILES

7. Estimated System Performance

The modeling analysis incorporated the recommended transit improvements into the NJMC travel demand model to determine the projected improvement in transportation network performance due to these transit enhancements. The model results show that the recommended transit improvements alone would reduce approximately 506 daily person trips on the District roadway network. Assuming an average vehicle occupancy factor of 1.5, this would eliminate about 337 daily automobile trips. In addition to the predicted ridership, existing Meadowlink shuttle routes performing similar functions could be incorporated into the proposed routes providing both a another source of public/private funding and additional ridership.

Although this reduction in the number of peak-period automobile trips would be minimal compared to the overall number of automobile trips on the roadway network, the candidate transit improvements would also help to achieve such objectives as improved transit connectivity, accessibility, and circulation through the Meadowlands District. This would be especially true for persons who depend on transit to reach employment and other economic and social activities. Aggressive marketing, especially focused on District employers through the programs of Meadowlink, could enhance their use. Any existing development would have the opportunity to participate into the shuttle service, providing an additional source of revenue for the public share of the routes cost and a low cost shuttle alternative for existing developments.

C. ROADWAYS

The District and surrounding region mainly depend on the roadway system for transporting people and goods. The NJMC *Master Plan* states that having sufficient roadway network capacity to handle the pressures of existing demand and the challenges of future demand is critically important for the economic well-being of the Meadowlands District and for maintaining the quality of life of its residents.

To identify existing and future condition roadway improvement needs, the roadway system analysis included the following three components:

1. Roadway segments – this macro-level component included linear segments of all types of roads (local, collector, arterials, and expressways/freeways). It identified

improvement needs based on available capacity and traffic volumes along each roadway segment.

2. Roadway interchanges – this micro-level component included analyzing uncontrolled or yield-controlled ramp junctions that facilitate merging and diverging maneuvers to/from major roadways. It identified improvement needs for ramp junctions.
3. Roadway intersections – this micro-level component included analyzing signal- and stop-controlled roadway junction points. It identified improvement needs based on available intersection and approach capacity to handle traffic volumes passing through the intersection.

1. Roadway Segment Analysis

a. NJMC Travel Demand Model

The analysis used the NJMC travel demand model to evaluate traffic performance along the district roadway network under the following scenarios:

1. 2006 Existing Condition: This scenario reflects the existing (2006) roadway network and existing traffic volumes.
2. 2006 Existing Condition with Committed Roadway Improvement Projects: The committed roadway improvement projects described in Chapter II will resolve some existing traffic problems. This scenario was used to analyze how the existing roadway network plus committed roadway improvements would handle existing traffic volumes. This analysis established the basis for determining roadway improvement needs under existing conditions.
3. 2030 Build Condition: This scenario includes the existing roadway network plus committed roadway improvements and projected future traffic volumes.
4. 2030 Build Condition with Transit Improvements: The recommended transit improvements previously described were included in this analysis to determine the extent of the improvement they would achieve. The results of this scenario established the basis for determining roadway improvement needs under 2030 future build conditions.

b. Analysis Methodology for Identifying Roadway Segment Improvements

The NJMC model provided the following two types of indicators for each roadway segment within the District under each scenario described above:

1. Peak Hour Volume-To-Capacity Ratio: The peak hour volume-to-capacity ratio (V/C) indicates whether each roadway segment in the network has capacity available to accommodate additional traffic volumes during the morning and evening peak periods, under each scenario, without becoming congested beyond a desired level of travel performance. In this analysis, a V/C ratio of 0.90 reflects conditions approaching significant congestion and therefore a threshold at which no further traffic can be accommodated without unacceptable degradation in travel quality.
2. Peak Hour Excess Volume over Capacity: The peak hour excess volume indicator reflects the number of vehicle trips on a given roadway segment exceeding the amount of trips carried at the desired performance threshold, the V/C ratio of 0.90, for that facility. The magnitude of the peak hour excess volume for each applicable roadway segment provides a basis for determining the type of improvement required to eliminate or reduce the congestion.

Details about these indicators and their use to determine appropriate location-specific roadway improvements are included in Appendix III-B1.

Of the 304 unidirectional NJMC model segments (unidirectional indicates that between point A and point B, each direction of travel on the roadway represents a separate element in the model network), the analysis found 71 that would warrant some form of improvement in the 2030 future build condition after the candidate transit improvements have been implemented (see Appendix III-B1). Of these 71 unidirectional segments, 29 need improvements under the 2006 Existing Condition with Committed Projects scenario, as well. The analytic process grouped these 71 unidirectional model segments into 25 locations within the following roadway corridors and geographical areas:

1. Newark-Jersey City Turnpike, NJ 7, and I-280 corridors and local roads in the Kearny area
2. NJ 3 corridor in the Lyndhurst and Rutherford areas
3. NJ 3 and NJ 495 corridors in the Secaucus area

4. NJ 120/Paterson Plank Road corridor in the East Rutherford areas
5. Local street network in the Secaucus area
6. Westside Avenue corridor in the Secaucus area

Appendix III-B1 describes the detailed analysis that identified worst-case peak hour needs along these corridors. This information includes the following:

1. Volume-to capacity ratio and excess volume over capacity plots during AM and PM peak periods (during 2006 Existing Condition with Committed projects and 2030 Build Condition with Transit Improvement scenarios)
2. Worst case peak hour excess volume over capacity for the roadway segments that would have capacity issues under existing and/or future scenarios
3. Proposed improvements at each problematic roadway segment

c. Candidate Roadway Segment Improvements

The analysis then considered various roadway segment strategies to improve performance for the segments that had significant excess volume over capacity during the peak hour. These improvement strategies fall under three broader types of solutions as follows:

1. Add more capacity to roadways
2. Operate existing capacity more efficiently
3. Encourage travel in less congestion-producing ways; modify land use patterns

Table III-2 lists improvement strategies by the solution type. Based on the roadway segment analysis, Table III-3 lists identified candidate roadway segment improvements. Figure III-3 shows a summary map of these improvements.

Table III-2: Linking Solutions to Congestion Problems

Add More Capacity	Operate Existing Capacity More Efficiently	Encourage Travel in Less Congestion-Producing Ways; Modify Land Use Patterns
• Add travel lanes on major freeways and streets • Close gaps in the street network; • Remove bottlenecks • Build overpasses or underpasses at congested intersections • Implement high-occupancy vehicle (HOV) lanes	• Meter traffic onto freeways • Optimize the timing of traffic signals • Provide faster and anticipatory responses to traffic incidents • Provide travelers with information on travel conditions and alternative routes and modes • Improve management of work zones • Identify weather and road surface problems and rapidly target responses • Anticipate and manage special events that cause surges in traffic • Provide reversible commuter lanes • Use movable median barriers to add capacity during peak periods • Restrict turns at key intersections • Make geometric improvements to roads and intersections • Convert streets to one-way operations and manage access • Improve roadway connectivity	• Promote programs that encourage transit use and ridesharing • Manage parking and curbside use • Encourage flexible work hours • Promote telecommuting • Encourage bikeways and other strategies that promote non-motorized travel • Implement pricing fees for the use of travel lanes based on the number of persons in the vehicle and the time of day • Price parking spaces based on the number of persons in the vehicle, the time of day or location • Strengthen land use controls or zoning • Manage growth (e.g., urban growth boundaries) • Require development policies that support transit-oriented designs for homes, jobsites, and shops • Offer rewards for high-density development, e.g., tax incentives, economic development financial subsidies, reduced traffic impact requirements.

Source: Traffic Congestion and Reliability: Linking Solutions to Problems, Final Report, Office of Operations, FHWA

Table III-3: Candidate Roadway Segment Improvements*

REF #	Roadway Segment Benefited	Candidate Improvement	Proportion of Excess Volumes under Existing Condition to Excess Volumes under Future Build Condition
L-1	Bergen Avenue between Newark-Jersey City Turnpike and Schuyler Ave. (westbound direction)	Provide operational improvements to the intersection of Bergen Avenue and Newark-Jersey City Turnpike	47%
L-2	Westbound I-280 segment between NJ Turnpike toll booths to the structure over Newark-Jersey City Turnpike	Extend existing deceleration lane from westbound I-280 to westbound Newark-Jersey City Turnpike. This will provide a continuous exit-only lane.	41%
L-3	Southbound US 1&9 between Utica Street and Tonnelle Circle	Provide additional travel lane on southbound US 1&9 just north of Tonnelle Circle. This improvement may become unnecessary if a new road, proposed by the Portway program, parallel to US 1&9 to the west, is built.	42%
L-4	NJ 3 segments between NJ 17 and Berry's Creek Road (both directions)	Improve network capacity and connectivity by linking NJ 3 service road located on both sides of the river with one-way lift bridge structures located north and south of NJ 3 alignment.	55%
L-5	NJ 3 segments between NJ 120 and Meadowland Parkway (both directions)	Achieve improved connectivity for local traffic by providing a bridge structure over the Hackensack River.	60%
L-6	Paterson Plank Road between NJ 17 and NJ 120	Optimize and coordinate signalized intersections along this corridor	0%
L-7	Westbound NJ 3 segment from the beginning of westbound Route 3 at US 1&9 to ramp for Westbound NJ 495/Turnpike approach	Provide additional travel lane on west-bound NJ 3 from the beginning of west-bound Route 3 at US 1&9 to ramp for Westbound I-495/Turnpike approach	53%

Table III-3: Candidate Roadway Segment Improvements (continued)

REF #	Roadway Segment Benefited	Candidate Improvement	Proportion of Excess Volumes under Existing Condition to Excess Volumes under Future Build Condition
L-8	Eastbound NJ 495 segment from NJ 3 to US 1&9	Provide an additional travel lane along eastbound I-495 from NJ 3 to US 1&9	70%
L-9	Plaza Center segment between eastbound NJ 3 service road and Paterson Plank Rd. (both directions)	Reallocate cartway to provide second lane southbound for combined through and left turn traffic	63%
L-10	Meadowland Parkway between NJ 3 and Broadcast Plaza	Intersection operational improvements along Meadowland Parkway	0%
L-11	County Avenue between Jefferson Avenue and Metro Way (southbound direction)	Provide operational improvements to County Avenue and Metro Way intersection	0%
L-12	Secaucus Road from US 1&9 to Postal Service Road (northbound direction)	Provide operational improvements to Secaucus Road and Postal Service Road intersection	0%
L-13	Westside Avenue between Paterson Plank Road and 83rd Street (northbound direction)	Provide central mutual left-turn lane to eliminate back-ups created by vehicles waiting to turn into driveways. Lane can become a travel lane when capacity requires additional lanes beyond 2030.	0%
L-14	Westside Avenue from 43rd Street to Paterson Plank Road	Improve connectivity by extending 43rd Street from Westside Avenue to Park Plaza Drive	0%
L-15	83rd Avenue between US 1&9 and Westside Avenue (westbound)	Provide operational improvements to intersection of Westside Ave & 83rd Street	0%
L-16	Eastbound NJ 7 between Newark Turnpike and Fish House Road	On NJ 7, east of Newark-Jersey City Turnpike merge and west of Fish House Rd. and on Fish House Rd. west of ramp to NJ 7 eastbound, install signals to meter traffic flow on Wittpenn Bridge to maintain flow across the bridge.	30%

*See Appendix III-B1 for details on segment assessment and improvement identification.


Figure III-3
Candidate
Roadway Segment
Improvements
MAP PREPARED FOR
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DMJM HARRIS | AECOM
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LEGEND
Intersection Improvements as part of Roadway Segment Improvements
Roadway Segment Improvements
District Roadways
NJMC District Boundary
0.30.15 0 0.3 0.6
MILES

2. Roadway Interchange Analysis

The roadway improvement process included analyzing uncontrolled or yield-controlled ramp junctions that accommodate merging and diverging maneuvers to/from major roadways to identify micro-level improvement needs within the District. The District has several major corridors, including NJ 3, NJ 17, NJ 120/Paterson Plank Road, Newark-Jersey City Turnpike, and I-280. The following interchange locations were selected for analysis:

1. Newark-Jersey City Turnpike and Fish House Road in Kearny
2. Newark-Jersey City Turnpike and Belleville Turnpike/NJ 7 in Kearny
3. Interstate 280 and Newark-Jersey City Turnpike in Kearny
4. NJ 120 and Washington Avenue in Carlstadt
5. NJ 3 and Meadowland Parkway in Secaucus
6. Eastbound NJ 3 service road and Paterson Plank Road in Secaucus
7. NJ 3 and Paterson Plank Road in Secaucus
8. Service road ramps and Rutherford Avenue/NJ 17 in Lyndhurst
9. NJ 3 and NJ 17 in Rutherford

The analysis covered 69 ramp junctions at these nine interchanges under 2006 existing and 2030 future build conditions. Of these, 35 locations are diverge ramp junctions, and 34 are merge ramp junctions. In addition to the ramp junctions, eight weave areas were also analyzed. Most of these locations were found to not benefit from interchange improvements.

a. Analysis Methodology

The NJMC travel demand model is a regional model and thus does not incorporate details associated with interchange ramp configurations. It also does not address the specific nature of diverging, merging, and weaving traffic flows that is required for analyzing interchange performance. Thus, NJMC travel demand model traffic volume outputs were not useful for the roadway interchange analysis.

Rather, to analyze the PM peak hour interchange ramp junction and weave area performance under existing conditions, 2-hour PM peak traffic counts were conducted at the above nine interchanges. The highest cumulative total of four consecutive 15-minute interval counts was used as the PM peak period volume at each location. These volumes were used to analyze 2006

existing condition interchange ramp junction and weave area performance using the Highway Capacity Software (HCS).

To analyze the same elements under the 2030 future build condition during the PM peak hour, NJDOT's annual traffic volume growth factors were applied. These growth factors, annual growth in traffic of 2% for mainline roadway segments and 1.5% for ramps, produced level-of-service results for the interchange merge/diverge ramps and weave sections that were considerably above the failure value in most cases. A sensitivity analysis using the overall modeled rate of 1.3% per year did not eliminate the need for the improvements. NJDOT's traffic count database was also researched to determine recent available traffic growth trend data at or near the interchange locations. Based on the HCS analysis, future condition ramp junction deficiencies were identified and improvements were suggested to enhance the performance to an acceptable level.

The location details for analyzed ramp junctions and weave areas are shown in Appendix III-B2. The appendix also includes performance evaluation tables displaying level-of-service information under 2006 existing and 2030 future build conditions. Detailed performance evaluation report cards from HCS are included in a separate interchange analysis technical memorandum.

b. Candidate Ramp Junction and Weave Area Improvements

The HCS analysis indicated that PM peak hour performance for all ramp junctions under existing conditions is within acceptable limits. Thus, no improvements have been suggested under the existing condition scenario for ramp junctions. Among the weave sections, one existing weave area improvement was identified at the interchange of NJ 17 and NJ 3; however, it is addressed in a future improvement recommendation.

The density of vehicles per mile per travel lane affects the level of service (LOS) at a ramp junction or weave area. LOS E indicates that the junction or weave area is approaching capacity, with some congestion. LOS F indicates that the junction or weave area is at or above capacity, with significant congestion. Under the 2030 future build scenario, several ramp junctions and weave areas showed unacceptable levels of service (LOS E and F) in the HCS analysis. Appropriate candidate improvement concepts were identified and tested using HCS

for nine juncture and weave locations at four interchange areas. Table III-4 summarizes the results; Figure III-4 provides their location. All projects are 100% attributable to future conditions.

Table III-4: Candidate Interchange Improvements

REF #	Location	Improvement
X-1	NJ 3 and Meadowlands Parkway	Extend deceleration lane from eastbound NJ 3 to Meadowland Parkway
X-2	NJ 3 and NJ 17	Grade separate to address weave along northbound NJ 17 between merge ramp from westbound NJ 3 service road and diverge ramp to eastbound NJ 3
X-3	Newark-Jersey City Turnpike and I-280	Extend merge ramp from eastbound Newark-Jersey City Turnpike to westbound I-280.
X-4	NJ 3 and Paterson Plank Road	Add deceleration lane from eastbound NJ 3 to eastbound Paterson Plank Road
X-5	NJ 3 and NJ 17	Extend merge ramp from NJ 17 northbound to NJ 3 eastbound
X-6	NJ 3 and NJ 17	Extend deceleration lane to NJ 3 before ramp from NJ 3 westbound to NJ 17 northbound
X-7	NJ 3 and NJ 17	For movement from NJ 17 southbound to NJ 3 westbound, extend acceleration lane
X-8	NJ 3 and NJ 17	Add travel lane on NJ 3 between merge ramp from NJ 17 northbound and diverge ramp to NJ 17 southbound

3. Roadway Intersection Analysis

Finally, the NJMC analyzed key stop-controlled and signalized intersections to identify potential roadway improvements. The study process assessed 55 intersections based on traffic count data (see Appendix III-B3). This assessment identified micro-level improvement needs within the District.

a. Intersection Analysis Methodology

In general, the evening peak hour represents the worst-case roadway traffic conditions and is therefore typically analyzed to assess needs. The NJMC model generated intersection turning movement volumes under existing PM peak hour conditions. These volumes were compared with actual traffic counts at ten sample intersections. However, the comparison showed that


Figure III-4
Candidate Roadway Interchange Improvements
MAP PREPARED FOR
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X4
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X7
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LEGEND
Additional Lane on Mainline or Ramp
Acceleration Lane/ Deceleration Lane Improvements
Grade Seperated Ramp Movements
District Roadways
NJMC District Boundary
0 0.2 0.4 0.8 1.2
MILES

intersection volumes from the regional NJMC model were not sufficiently accurate for conducting micro-level analysis. Therefore, the actual evening peak hour traffic counts became the basis for the existing condition analysis.

To analyze intersection performance under the future build condition, 2030 traffic volumes were derived from the existing condition turning movement counts, which were increased by the intersection approach volume growth factors from the NJMC model. The process also considered the location and nature of future development projects to verify the appropriateness of these future condition projections. The analysis identified the intersection improvements necessary to bring the intersection to an acceptable level of service wherever possible. This includes the following types of improvements:

1. Control Improvements
    - Convert stop-sign control to yield control by providing channelization
    - Signalize stop-controlled intersections
    - Grade separate intersecting streets

2. Operational Improvements
    - Optimize and coordinate signal operation by changing intersection signal phasing, offsets, and/or signal split timings

3. Capacity Improvements
    - Provide and/or extend storage lanes for turning movements at intersections
    - Provide additional through-movement capacity by providing auxiliary through lanes near the intersection
    - Provide near-side or far-side jug handles

b. Existing Condition Intersection Performance

Nine intersections showed an unacceptable level of service (LOS E, approaching capacity with some delay, or F, at or above capacity with significant delay) under the existing condition PM peak hour. Seven of these intersections failed (LOS F), while the remaining two approached

failing (LOS E). Table III-5 shows the improvements identified to bring performance of these intersections to an acceptable level of service (LOS D) (see Appendix III-B3, Table 1, for details).

Table III-5: Existing Condition Candidate Intersection Improvements

Intersection Location	Improvement Type
Redneck Avenue & Moonachie Avenue	Signal split timing improvement & turning movement storage lane additions
Moonachie Avenue & Grand Street	Intersection signalization
Washington Avenue & Commerce Road	Signal split timing improvement
Murray Hill Parkway & East Union Ave.	Turning movement storage lane additions
Paterson Plank Road & Terminal Road	Signal phasing and split timing improvement & turning movement storage lane additions
Paterson Plank Road & Harmon Meadow Boulevard	Signal split timing improvement
NJ 3 & Plaza Center	Convert stop-control to yield control by providing an acceleration lane
Valley Brook Avenue & Orient Way	Turning movement and through movement storage lane additions
Meadowlands Parkway & Westbound NJ 3 Ramp	Turning movement storage lane additions

This work also identified an opportunity for signal phase modification and/or signal split optimization at nine other intersections that currently have acceptable levels of service. These changes would improve the level of service for individual intersection approaches (see Appendix III-B3 or details).

These intersection upgrades are not candidates for inclusion in the MDTP in that they address existing, not future, needs.

c. 2030 Future Build Condition Intersection Performance

The analysis found that 19 intersections would have an unacceptable level of service (LOS E or F) under the 2030 future build condition PM peak hour. Fifteen of these intersections would fail (LOS F), while the remaining four would be at a near-failing level (LOS E). Table III-6 lists recommendations to improve the performance of these intersections to an acceptable level (see Appendix III-B3, Table 2, for details). Figure III-5 shows the locations of these intersection improvements.

Table III-6: 2030 Future Build Condition Candidate Intersection Improvements

Ref #	Location	Improvement
I-1	NJ 46 & Industrial Avenue	Signal cycle and split timing improvement & turning movement storage lane additions
I-2	Westside Avenue & 69th Street	Signal split timing improvement
I-3	Westside Avenue & Paterson Plank Road	Grade separation of westbound Paterson Plank Road to northbound Westside Avenue movement and southbound Westside Avenue to westbound Paterson Plank movement
I-4	Murray Hill Pkwy & E. Union Avenue	Intersection signalization and storage lane additions
I-5	Paterson Plank Road & Harmon Meadow Boulevard	Turning movement storage lane additions
I-6	County Avenue & Secaucus Road	Signal split timing improvement & turning movement storage lane additions
I-7	County Avenue & Center Avenue	Turning movement storage lane additions
I-8	County Avenue & Paterson Plank Road	Turning movement storage lane additions
I-9	Paterson Plank Road & Humboldt Street	Signal phasing and split timing improvement & turning movement storage lane additions
I-10	Meadowland Parkway & Harmon Plaza	Signal split timing improvement & turning movement storage lane additions
I-11	Center Street & 10th Street	Signal split timing improvement
I-12	Paterson Plank Road & 1st Street	Signal phasing and split timing improvement & turning movement storage lane additions
I-13	American Way & Meadowlands Parkway	Storage lane additions
I-14	Secaucus Road & Hartz Way	Turning movement storage lane additions
I-15	Meadowland Parkway & Seaview Drive	Storage lane additions
I-16	New County Road & Castle Road	Intersection signalization
I-17	Polito Avenue & Rutherford Avenue	Signal split timing improvement & turning movement storage lane additions
I-18	Valley Brook Avenue & Clay Avenue	Intersection signalization and storage lane additions
I-19	Meadowland Parkway & eastbound NJ 3 ramp	Signal split timing improvement & turning movement storage lane additions


Figure III-5
Candidate Roadway Intersection Improvements
MAP PREPARED FOR
New Jersey Meadowlands Commission
MAP PREPARED BY
DMJM HARRIS | AECOM
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280
95
LEGEND
Grade Seperated
Additional storage lanes
New signal
New signal and additional storage lanes
Signal phasing/timing modifications
Additional storage lanes & signal phasing/timing modifications
District Roadways
NJMC District Boundary
0 0.2 0.4 0.8 1.2
MILES

D. PEDESTRIANS

In developing the Plan, the NJMC also assessed pedestrian needs, identified improvements to address those needs, and estimated the costs of those improvements. In general, the key determinants of pedestrian needs are access to transit services, connections between areas that are walkable, and access to community facilities.

1. Analysis Methodology

Unlike the above roadway analysis, this assessment did not classify recommended pedestrian improvements as "existing" and "future." Instead, it considered the improvements as an ongoing opportunity to improve alternative travel mode options for the District. However, the costs for the recommended pedestrian improvements were apportioned based on existing and future Transit Score indices (see Chapter IV). The Transit Score index includes elements that directly relate to pedestrian activity, such as population and employment density and the concentration of households with no or just one available vehicle.

The assessment used aerial photography to identify pedestrian needs. The methodology established need based on a lack of sidewalks or crosswalks between walkable origins and destinations, transit service access, and connectivity between appropriate land uses. Organizing these needs into geographic concentrations identified six nodes of missing crosswalks or sidewalks adjacent to transit stops or land use concentrations.

2. Candidate Pedestrian Improvements

Table III-7 lists the seven nodes with identified candidate pedestrian improvements, while Figure III-6 shows the location of these nodes. Details of the identified sidewalk and crosswalk improvements are included in Appendix III-C.

Table III-7: Candidate Pedestrian Improvements

Node #	Node Name	Need Category*	Total Crosswalks Needed	Total Feet of Sidewalks Needed
P-1	Valley Brook Avenue	Development/ Transit	9	8.559
P-2	Harrison Avenue	Development	0	944
P-3	Westside Avenue	Development	15	14,542
P-4	Paterson Plank Road	Development	24	11,414
P-5	New County Road/New County Road Extension	Transit	6	8,209
P-6	Moonachie Avenue	Transit	18	1,674
		TOTAL :	**72**	**45,342**

*Indicates whether the pedestrian need is based on the need for connectivity between centers of development, to provide access to transit services, or both.

E. BICYCLE

The final transportation network component for analysis was the bicycle route system. As Chapter II describes, the District currently has only one designated bicycle route, although it also has two major greenway/trail routes in various stages of completion:

Meadows Path is a pedestrian trail system that currently includes seven miles of trails, including the Valley Brook Avenue Greenway, a 1.5 mile pedestrian walkway in Lyndhurst, providing linkage between DeKorte Park and the Meadowlands Corporate Center.

The Secaucus Greenway is a planned 15-mile waterfront greenway on the eastern portion of The District. Significant portions of the Greenway that are completed include trails in the Hudson County Park at Laurel Hill and the 1.5-mile Mill Creek Marsh Trail.

Both Meadows Path and the Secaucus Greenway provide potential for enhancing bicycling options through improved connectivity to major residential and employment centers and other transportation facilities. For the purposes of this analysis, we have included proposed segments of Meadows Path and the Secaucus Greenway from the NJMC Green Map as part of the recommended bicycle improvements to the District.

1. Analysis Methodology

Identifying concentrations of employment and residential development as potential origins or destinations for non-recreational bicycle trips was the first step in the analysis. The District has ten development centers that currently have more than 2,500 employees and/or 300 dwelling units. Based on anticipated future development, these centers will remain the key development centers for the District in the future (see Chapter II).

Because of the multiplicity of possible connections, the analysis focused on connections between these development centers and existing or planned bicycle trails, especially the two main multi-use trail/greenway routes – the Secaucus Greenway and Meadows Path. Table III-8 shows the development centers and indicates whether each has a bicycle route connection with either of the two main trails.

Table III-8: Existing Development Centers and Potential Trail Connections

Location	Trail Connection	
	Secaucus Greenway	Meadows Path
Secaucus: Outlet/Warehouse District	Yes*	No
Secaucus: Mill Creek Mall/Harmon Meadows Plaza	Yes	No
North Bergen: Westside Avenue Corridor	Yes*	No
Kearny: Belleville Turnpike Corridor	No	Yes*
Lyndhurst: Meadowlands Corporate Center	No	Yes
Rutherford: NJ 17/NJ 3	**No**	**No**
East Rutherford: NJ 17/Paterson Plank Road	**No**	**No**
Carlstadt: Washington Avenue/Commercial Avenue	**No**	**No**
Moonachie: Moonachie Avenue	**No**	**No**
Teterboro: Industrial Avenue	**No**	**No**

* denotes a connection to a proposed portion of a trail

2. Candidate Improvements

This section describes the bicycle route improvements necessary to serve each development center that currently does not have a connection with either major path, either directly or indirectly. Bicycle route improvements have been segmented by municipality and labeled by reference numbers B-1 through B-13. Table III-9 and Figure III-7 summarize the identified improvements. Note that segments are already proposed as being part of either the Secaucus Greenway or Meadows Path.

a. Carlstadt (B-1)

The central part of Carlstadt within the District does not have access to the proposed portion of Meadows Path, due in part to a large expanse of wetlands. A 1.6-mile bicycle route could follow Washington Avenue and Terminal Road and connect with Moonachie Avenue/Empire Boulevard.

b. East Rutherford (B-2)

The area of East Rutherford in the District, between NJ 17 and the Meadowlands Sports Complex, does not have access to Meadows Path due to the presence of Berry's Creek, the Meadowlands Sports Complex, and the surrounding roadway system. A 1.5-mile route along Paterson Plank Road would link this development center to a proposed portion of Meadows Path west of the NJ Turnpike.

c. Moonachie (B-7)

The Moonachie area, which includes a mix of industrial, commercial, community facilities, and residential development, also is separated from Meadows Path by a large expanse of wetlands. A 2.2-mile route along Moonachie Avenue would connect this area to a proposed portion of Meadows Path located east of Horizon Boulevard.

d. Rutherford (B-10)

The portion of Rutherford in the District and north of NJ 3 does not have direct access to the Meadows Path because of NJ 3. A connecting bicycle route could use Veterans' Boulevard, the NJ 3 service road, and Wall Street West to reach Meadows Path in Lyndhurst (a distance of about one mile).

e. Teterboro (B-13)

The Teterboro area is somewhat isolated from trail access, but a 1.7-mile route along Industrial Avenue and Railroad Avenue would connect this center with the Moonachie Avenue bicycle route.

f. Meadows Path (B-4, B-5, B-6, B-8, and B-12)

The extension of Meadows Path that will span the length of the Meadowlands District from Little Ferry to Kearny includes all of the candidate improvements in the above referenced areas. The construction of this pathway would link existing parks, wilderness areas, and cultural resources throughout nine of the fourteen District municipalities via a single bicycle/pedestrian network west of the Hackensack River. Nearly 7.5 miles of Meadows Path are in place. Most of the miles lie within the boundaries of Richard W. DeKorte Park and the nearby Meadowlands Corporate Center in Lyndhurst. The Saw Mill Creek Trail, a one-mile section connecting DeKorte Park with the 1E Landfill, was completed in the summer of 2001.

g. Secaucus Greenway (B-3. B-9, B-11)

The Secaucus Greenway is a proposed 15-mile waterfront greenway on the eastern portion of the District that encompasses all of the candidate improvements within the above referenced areas. If constructed, this greenway would allow public access along the Hackensack River and provide a continuous pedestrian trail linking retail, office, commercial, and adjacent residential areas in Secaucus. Portions of the greenway that have been completed include trails in the Hudson County Park at Laurel Hill and the 1.5-mile Mill Creek Marsh Trail.

Table III-9: Candidate Bicycle Route Improvements

Ref#	Area	Route	Length (Miles)
B-1	Carlstadt	Empire Boulevard/Patterson Plank Road/Washington Avenue/Terminal Road	6.1
B-2	East Rutherford	Murray Hill Parkway/Paralleling Pascack Valley Line	1.6
B-3	Jersey City	West Side Avenue/Paralleling Boonton Line	1.1
B-4	Kearny	Paralleling Harrison-Kingsland Line	1.8
B-5	Little Ferry	Mehrhof Road/Gates Road/Riverside Avenue/Empire Boulevard/Dietrich Street	1.2
B-6	Lyndhurst	Wall Street West/Paralleling NJ Turnpike (West)	1.0
B-7	Moonachie	Empire Boulevard/Moonachie Avenue/Park Avenue/Industrial Avenue	3.0
B-8	North Arlington	Paralleling Harrison-Kingsland Line	1.8
B-9	North Bergen	71st Street/West Side Avenue/Paterson Plank Road/Terminal Road	2.1
B-10	Rutherford	North Node Access Road/ Paralleling NJ Turnpike (West)/Thomas E. Dunn Memorial Highway	2.8
B-11	Secaucus	Fraternity Meadows Development/Meadowland Parkway/Castle Road/New County Road	5.5
B-12	S. Hackensack	Terminal Lane/Off Road Path East of Horizon Boulevard	0.4
B-13	Teterboro	Industrial Avenue/Railroad Street	1.7
		TOTAL	**30.1**

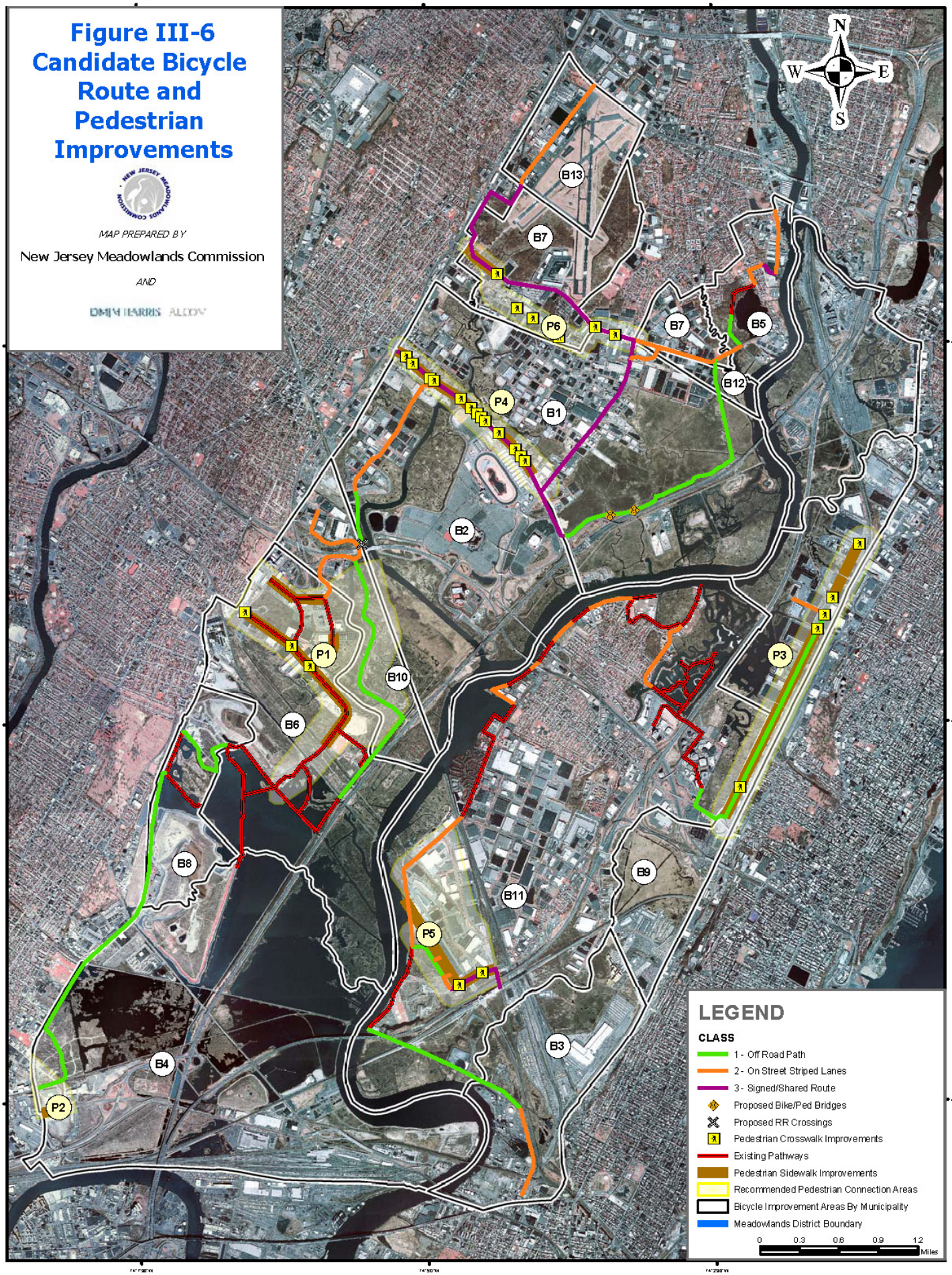
Figure III-6
Candidate Bicycle Route and Pedestrian Improvements

MAP PREPARED BY

New Jersey Meadowlands Commission

AND

DMJM HARRIS AECOM



F. ASSESSMENT OF CANDIDATE IMPROVEMENTS

A final step in preparing the program of candidate improvements was to assess the potential benefits of these improvements (see Figure III-8) to the performance of the District's transportation system.

1. Transit Improvements

While transit use in the Meadowlands District and in the North Jersey - New York Metro area is higher than the state and national averages, transit is only a minor component of journey-to-work travel in the area. The analysis based on the NJMC regional transportation model (2030 build with transit improvements scenario), as expected, showed that the identified transit improvements will not significantly help to improve performance of the District highway network (see Table II-7).

The candidate transit improvements, however, also provide crucial qualitative benefits related to connectivity and local circulation. Each of these short-term improvements could be implemented with ease on existing roadways with support from Meadowlink in marketing and promoting travel demand management. The new shuttle bus services would provide cost-effective and timely solutions to future transit needs by producing the following benefits:

- Multi-modal connectivity between local and regional bus service and commuter rail
- Service to existing large employment centers and proposed multi-use redevelopment areas that are currently less accessible to bus or rail transit
- Shorter trip times for bus riders through transit route streamlining
- Congestion relief on major roadways in the District through increased multimodal connectivity.

2. Roadway Segment Improvements

The NJMC regional transportation model analyzed a future 2030 Build scenario that included the candidate roadway segment improvements in the transportation network in addition to the candidate transit improvements. This analysis found that the identified segment improvements would provide very minimal benefits (see Table III-10). This limited benefit is

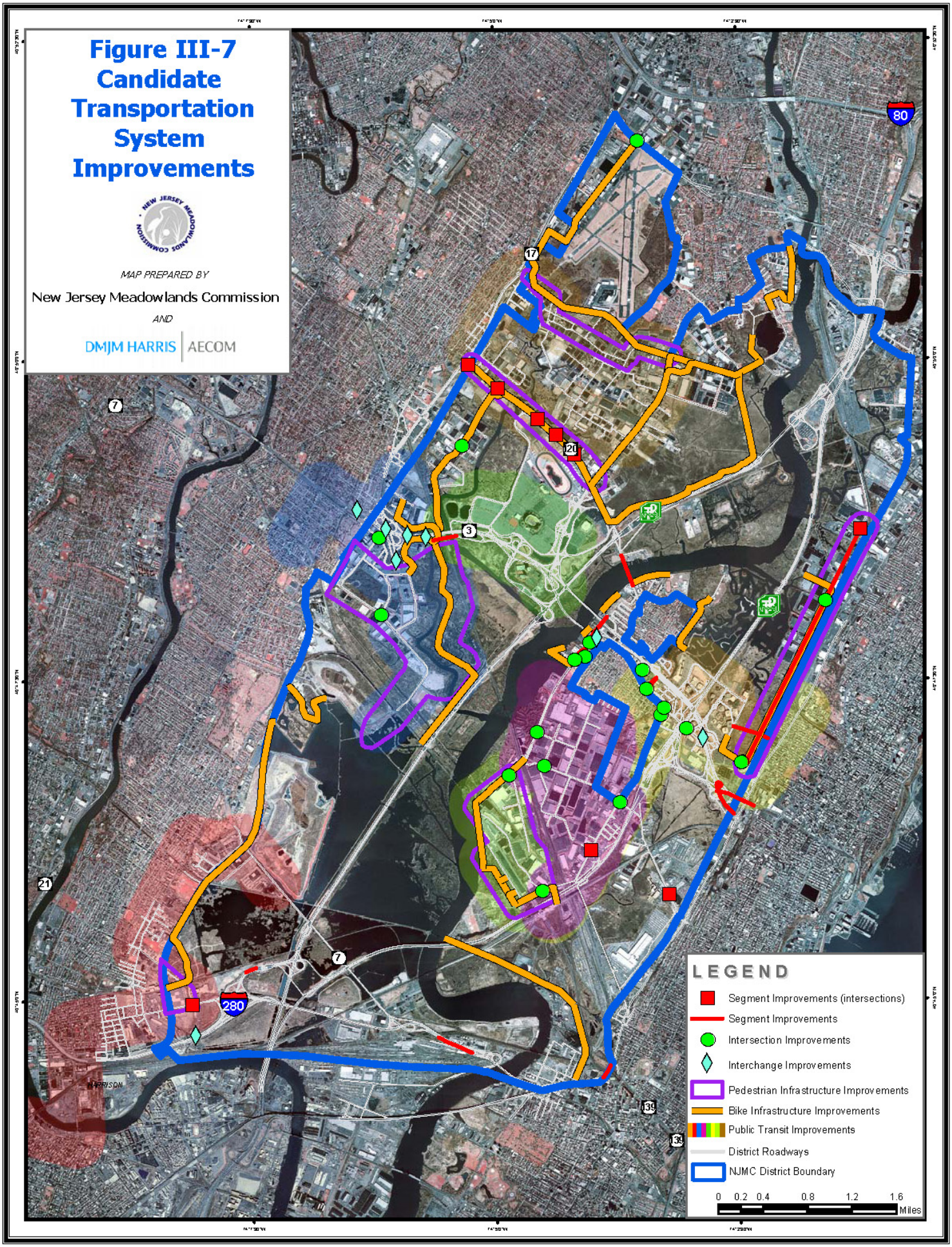


Figure III-7
Candidate Transportation System Improvements
MAP PREPARED BY
New Jersey Meadowlands Commission
AND
DMJM HARRIS | AECOM
LEGEND
Segment Improvements (intersections)
Segment Improvements
Intersection Improvements
Interchange Improvements
Pedestrian Infrastructure Improvements
Bike Infrastructure Improvements
Public Transit Improvements
District Roadways
NJMC District Boundary
0 0.2 0.4 0.8 1.2 1.6
Miles

due to the significantly high levels of vehicular travel on the roadway network in northern New Jersey that saturates the entire system and is only compounded by growth to the forecast year 2030. Under these future conditions, any enhancement of capacity or improvement in traffic flow provided by the candidate segment improvements will be largely overwhelmed by traffic shifts to the improved facility.

Table III-10: Summary of Model Analysis with Segment Improvements

Indicator	Build plus Transit Improvements (2030)	Build plus Transit Improvements and Segment Improvements (2030)
Lane miles	386	387
VMT (miles)	1,948,858	1,954,068
Average speed (mph)	21.0	21.1
VHT (hours)	124,755	121,532
Congested lane miles (V/C>0.9)	176	172
% Congested lane miles	46%	44%

Source: NJMC model

3. Interchange Improvements

The candidate interchange improvements were of two types – ramp junction improvements and weave section improvements. The analysis showed that the identified ramp junction improvements at seven locations would improve near failing (LOS E) or failing (LOS F) ramp junction performance to an acceptable level of service (LOS A through D). Of the two identified weave area improvements, one would improve weave section performance from a failing level (LOS F) to an acceptable LOS, while the other improvement would eliminate the weave section altogether. These identified ramp junction and weave area improvements would improve traffic operations at these specific locations.

It should be noted, however, that HCS analysis is a static traffic assignment analysis, unlike the NJMC model that undertakes dynamic traffic assignment. In other words, HCS analysis does not consider the effects of shifts in traffic patterns due to implementing the identified improvement. Most analyzed ramp junctions and weave areas are located on primary roadways

along regional corridors, which are likely to experience shifts in traffic patterns due to the proposed improvements, comparable to the segment improvements.

4. Intersection Improvements

The identified future condition intersection improvements at nineteen intersections of the analyzed fifty-five intersections will provide the following benefits:

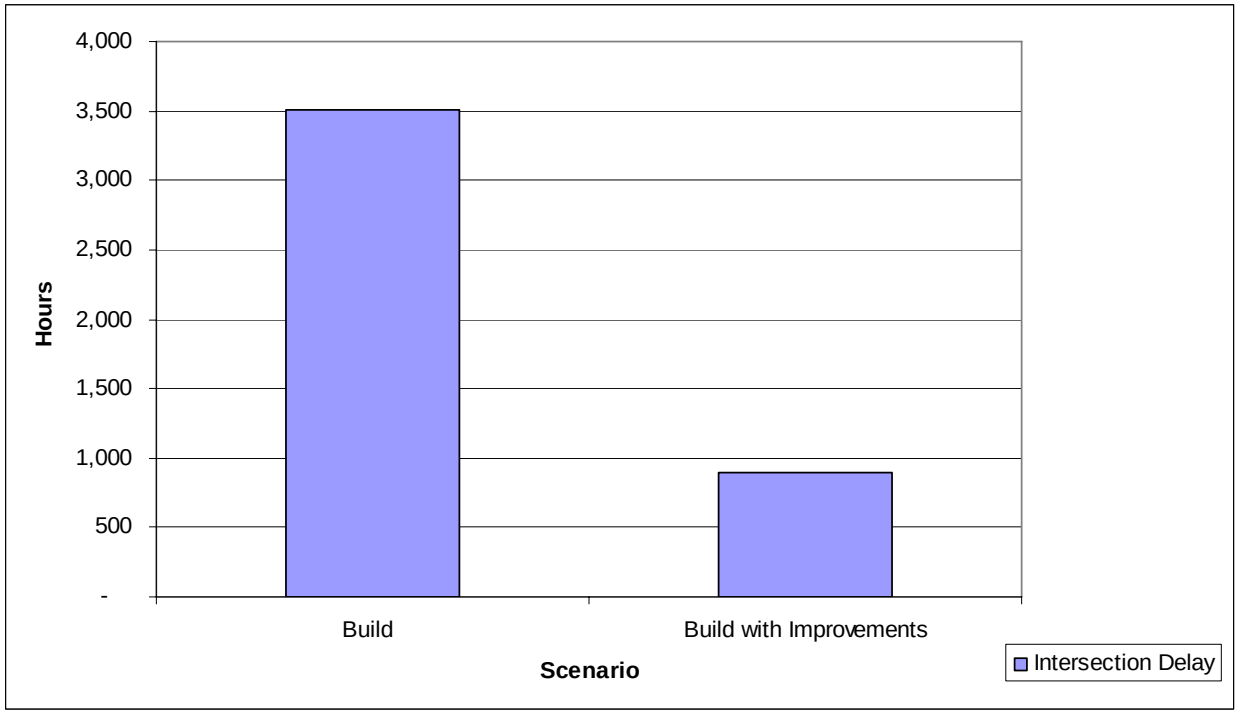
a. Overall performance of the intersection will be improved to an acceptable level of service
b. Control delays and average delay per vehicle passing through each of these intersections will be reduced
c. Coordination of sequential signals will be improved which will result in improved traffic flows

At 12 intersections of the nineteen intersections where improvements have been identified under the future condition, improvements will result in significant improvement of intersection LOS from failing (LOS F) or near failing (LOS E) levels to LOS A through C while at remaining seven intersections the identified improvements would achieve intersection performance enhancement to LOS D. The proposed improvements would reduce total delay at the nineteen intersections under the future build condition by 75% (See Table III-11 and Figure III-9), a significant improvement. In addition, these improvements would decrease the emissions of key air pollutants (CO, NOx, and VOC) by 60% or more.

Table III-11: Summary of Intersection Improvement Performance

Performance Measure	Build	Build w/ Candidate Improvements	Percent Reduction
Total overall intersection delay (hours)	3,514	891	75%
CO emissions (kg)	251.66	96.89	61%
Nox emissions (kg)	48.97	18.88	61%
VOC emissions (kg)	56.51	22.46	60%

Figure III-8: Summary of Intersection Improvement Performance



5. Pedestrian and Bicycle Improvements

While no quantitative analysis was conducted to analyze the benefits of the identified pedestrian and bicycle improvements, these improvements have been suggested to achieve the following goal-oriented benefits:

a. Encourage alternative transportation modes by improving access to the transit nodes within the District.
b. Improve alternative transportation mode connectivity between compatible origin-destination land use pairs in close proximity to each other.

G. DISTRICT-WIDE PROGRAMS

In addition to identifying specific transportation network or service improvements to support the District growth over the next two decades, the Plan includes several initiatives intended to support the regular response to smaller scale needs that will emerge as specific development proposals become reality, monitor conditions, explore additional options and administer the District fee collection procedures. Many of these activities would be undertaken in partnership, both collaboration and funding, with the appropriate agency or agencies.

1. Traffic Signal Timing

This program would enable the District to collaborate with the owner of signal installations to evaluate and reset the signal timing at intersections nearby or affected by development and yet not captured through the macro and micro analyses of the Plan.

2. Intersections and Signals for Development Access

Where anticipated development or redevelopment sites are sufficiently large, either individually or in combination, improved access to the roadway network in the form of new of intersections or signalizing existing intersections will be necessary. This program provides funding for ten such locations associated with expected development sites (see Table III-12).

Table III-12: Development Intersection Improvements

Ref #	Intersection	Improvement
DI-1	Paterson Plank Road (Redevelopment Area)	Broad Street restriping, intersection signalization at 2 locations (Paterson Plank Road & Murray Hill Parkway and Paterson Plank Road Broad Street)
DI-2	Bergen Avenue & Site Driveway (Kearny)	Intersection signalization and control revision
DI-3	Belleville Turnpike & Barszcewski Street	Intersection signalization
DI-4	Secaucus Road & Site Driveway (Vacant Property)	Intersection signalization
DI-5	Westside Avenue & 43rd Street	Intersection signalization
DI-6	Paterson Plank Road & Site Driveway (Vacant Property)	Intersection signalization
DI-7	Paterson Plank Road between Harmon Meadow Boulevard and Westside Avenue	Signal and controller revisions
DI-8	Secaucus Road & Meadowland Parkway	Add an auxiliary lane along Meadowland Parkway northbound north of Secaucus Road to American Way
DI-9	Seaview Drive & Meadowland Parkway	Intersection signalization
DI-10	New County Road & Castle Road	Intersection signalization

3. Signal Integration

Major and minor arterials in the District would benefit from the installation of state-of-the–art traffic signal systems to monitor and respond to changes in traffic flow. This program would support the continuing identification of opportunities to apply new signal technology, especially for roads not in the regional travel model network, and their implementation.

4. Planning Studies

The conduct of further detailed assessment of opportunities/needs for transit (such as those identified in Chapter VIII, ranging from bus route rationalization to new rail transit services such as the extension of light rail to District locations), goods movement, bicycle, pedestrian, safety and travel demand management or land use options could be undertaken as conditions change, conducted in partnership and cost sharing with the appropriate public agency. Additionally, the NJMC will collaborate with the NJDOT, the Port Authority of New York and New Jersey, and NJTPA on a future District-wide freight analysis study to improve goods-movement capacity and mitigate potential development based increases in roadway truck traffic volumes.

5. Transportation Efficiency Credit Program

This program would fund the adoption of the various strategies to meet District objectives in encouraging land use/site design measures to encourage non-auto travel or reduced trips. The program would provide funds to offset trip or fee credits for such measures as described in Chapter VI.

6. Incident Management

Incident management can significantly reduce the congestion experienced by roadway users. This program would enable the District to join with other public agency partners to identify effective incident identification, notification, and recovery measures for District roads. Implementation and operation of identified additional measures beyond those in place would be the responsibility of the facility's respective operating agencies.

7. Traffic Counting

Traffic counting would document the outcomes of the plan and support further assessment of needs and traffic impacts.

8. Regional Model

The District would assure the maintenance and further refinement of the NJMC travel model for future applications in updating the Plan or undertaking other analysis.

9. District Administration

The on-going administration of the District would include:

- the periodic update of the District Transportation Plan to reevaluate conditions and reset the investment strategies as development and plan implementation proceed over time;
- the conduct of the fee assessment process to set fees for development and collect them; and
- the dispensing revenues through individual project agreements with public partners to underwrite the development, design and construction of each improvement.

IV. ESTIMATED COSTS OF CANDIDATE IMPROVEMENTS

A. INTRODUCTION

This chapter presents cost estimates for the candidate transportation improvements described in Chapter III. These estimates include the costs to develop, design, and construct each improvement. They also identify the percentage and amount of the improvement attributable to existing development versus future new development, which determines which costs could be subject to the fee assessment process as presented in Chapter VI. These estimates also include costs for the District programs, planning, and administration. As Table IV-1 shows, over $280 million could be subject to fee assessment.

Table IV-1: Estimated Costs of Candidate Transportation Improvements

	Total Costs	Future Costs
Public Transit	$ 41,200,000	$ 15,701,000
Roads	$ 398,455,600	$ 235,706,095
Pedestrian	$ 3,194,870	$ 1,318,334
Bicycle	$ 5,842,659	$ 1,963,883
District-wide Programs	$ 24,688,412	$ 24,688,412
TOTAL PROGRAM COSTS	**$473,381,541**	**$279,377,724**

The following sections describe the estimated costs for the candidate improvements for public transit, roadways, pedestrians, and bicycles. Appendix IV provides a list of all candidate improvements, their cost estimates, and a detailed description of the cost estimating methodology, including how costs were allocated to existing and future development needs.

B. PUBLIC TRANSIT

Chapter III proposed six new shuttle services for the District. These shuttles would serve the sub-areas of Kearny, Secaucus (three routes), Lyndhurst/Rutherford, and Carlstadt/Moonachie. The costs to establish and operate these services include operating, fleet acquisition, and facilities costs. The cost estimates cover a 24-year period, with the average lifespan of a 20 to 22 passenger shuttle bus being 3 years. Table IV-2 summarizes the costs for each candidate service.

Table IV-2: Estimated Costs for Candidate Public Transit Services

Ref #	Route(s)	Total	Future Share	Future Costs
T-1	Kearny Shuttle	$ 8,200,000	62.6%	$ 5,133,200
T-2	Lyndhurst/Rutherford Shuttle	$ 8,200,000	46.2%	$ 3,788,400
T-3, T-4 & T-5	Secaucus Shuttles (three routes)	$ 20,600,000	30.3%	$ 6,241,800
T-6	Carlstadt/Moonachie Shuttle	$ 4,200,000	12.8%	$ 537,600
	TOTAL	**$ 41,200,000**		**$ 15,701,000**

1. Operating Costs

To determine operating costs, the NJMC first identified the anticipated round-trip route distance and average operating speed[1]. These two factors combine to produce the average number of vehicle hours for one trip. Total daily vehicle hours for each service were then calculated using trip time, headway, and service span. Multiplying the daily vehicle hours by an estimated cost of $70 per hour (as estimated by the NJMC and Meadowlink) resulted in the average daily operating cost. Finally, the expected number of service days per year (260) and the total number of years for the estimate (24) were factored into the equation to arrive at the total estimated operating costs.

2. Fleet Costs

The projected trip time was compared with the proposed headway (service frequency) to determine the number of buses necessary to maintain the scheduled frequency for each service. A 15% factor was applied to account for the need for backup/spare buses. This process assumed a pool of spare buses that would be available for all services. This assumption reduces the necessary number of spare buses, and the cost estimating procedure allocated fractions of the spare buses to the different services. After calculating the total vehicle needs, the process assumed and applied a cost of $60,000 per 20 to 22 passenger shuttle bus to calculate the fleet

[1] Since the level of planning analysis did not include travel time runs along individual corridors, posted speed limits, along with dwell and recovery time assumptions, were used to develop average operating speeds. During actual route planning, travel time corridor runs can be used to more precisely assess average operating speeds.

costs for each service. This cost was then multiplied by 8 to reach the total 24-year cost of obtaining the fleet, as each shuttle bus has a service life of approximately three years. The NJMC obtained the above information from Meadowlink.

The six bus shuttle routes described above will begin operations in stages (coinciding with the new development and increased need for transit). This means that the entire fleet of shuttle buses will not be needed at year one. Instead, limited services utilizing a minimum number of shuttle buses would begin operations on one route at that time, with full operations to be implemented by the year 2030 or before. As a result of this situation, development fees collected from previous years by the District to fund the other five shuttle bus routes will be readily available.

3. Facilities Costs

Since the proposed services would allow riders to "flag" buses at any participating development along the route, the services may not require separate bus stops and related infrastructure such as signs and shelters. It was assumed, nonetheless, that each route would have at least one shelter, along with signs every one-half mile.

4. Existing versus Future Costs

As Chapter III explains, the process of assessing public transit improvement needs did not identify separate projects for existing needs and for future needs. However, a methodology was necessary to allocate the costs of the proposed improvements among existing and future needs. This process compared the existing and future Transit Score indices for each service area and calculated a ratio of future costs to total costs for each improvement.

C. ROADWAYS

Chapter III proposes roadway improvement projects in three categories: roadway segments, intersections and interchanges. Table IV-3 summarizes the estimated improvement costs in each category.

Table IV-3: Estimated Costs for Candidate Roadway Improvements

	Total Cost	Future Costs
Segments	$312,863,500	$ 159,113,995
Intersections	$ 13,742,100	$ 13,742,100
Interchanges	$ 62,850,000	$ 62,850,000
TOTAL	**$ 398,455,600**	**$ 235,706,095**

1. Segments

Table IV-4 summarizes the estimated costs of improvements identified by the segment analysis process. These projects include some intersection improvements that are not included in the separate intersection analysis. The potential need at these intersections surfaced during the segment analysis, but actual traffic counts were not available for direct evaluation within the intersection analysis methodology (see next section). Also, since the process did not separately identify improvement projects to meet existing needs (because of the nature and scale of the analysis), the cost estimates for each improvement include some costs attributable to future development. Cost shares for the proposed segment improvements were based on the ratio of excess volumes for existing conditions to the excess volumes for future conditions. The estimated costs reflect current (2006) development and use historical data/costs from previous NJDOT road construction projects with similar scopes of work.

Table IV-4: Cost Estimate Factors for Segment Improvements

Element	Cost
New 2-lane arterial road	$ 3,360,000 / mile
Traffic signal	$ 250,000 each
Signal intersection control revision	$ 98,000 each
Signal timing revisions	$ 3,000 each
Wetland mitigation	$ 130,000 / acre
Retaining walls	$ 160 / SF
Widening existing bridge	$ 300 / SF
Removing existing bridge structure	$ 50 / SF
New bridge structure	$ 270 / SF
Mobilization	10% of contract amount
Clearing & Grubbing	5% of contract amount
Traffic Control	8% of contract amount
Preliminary engineering	15% of contract amount
Construction engineering	10% of contract amount
Special studies & value engineering	Varies based on complexity
Surveys	$ 25,000 to $50,000
Right-of-way commercial land	$ 25 / SF
Right-of-way residential land	$ 10 / SF

The cost assumptions for constructing the roadway segment improvements appear in Table IV-5. The right-of-way costs were estimated individually for each improvement, and the process assumed that preliminary engineering and construction engineering would be a certain percentage of the contract costs.

Table IV-5: Candidate Segment Improvements and Cost Estimates

Ref #	Improvement	Estimated Cost	Future Share	Estimated Future Cost
L-1	Operational improvements at the intersection of Bergen Avenue & Newark-Jersey City Turnpike	$ 100,000	53%	$ 53,000
L-2	Extended deceleration lane from westbound I-280 to westbound Newark-Jersey City Turnpike	$ 2,900,000	59%	$ 1,711,000
L-3	New southbound travel lane along US 1&9 between Tonnelle Circle and Utica Street	$ 8,500,000	58%	$ 4,930,000
L-4	New bridge along NJ 3 across Berry's Creek	$137,200,000	45%	$ 61,740,000
L-5	New bridge along NJ 3 across the Hackensack River	$103,000,000	40%	$ 41,200,000
L-6	Intersection operational improvements along NJ 120	$ 400,000	100%	$ 400,000
L-7	New travel lane along westbound NJ 3 between US 1&9 and I-495	$ 17,500,000	47%	$ 8,225,000
L-8	New travel lane along eastbound I-495 between NJ 3 and US 1&9	$ 15,000,000	30%	$ 4,500,000
L-9	Reallocate cartway to provide second lane southbound for combined through and left turn traffic	$ 13,500	37%	$ 4,995
L-10	Intersection operational improvements along Meadowland Parkway	$ 1,950,000	100%	$ 1,950,000
L-11	Intersection operational improvements along County Avenue	$ 200,000	100%	$ 200,000
L-12	Intersection improvements at Secaucus Road & Postal Service Road	$ 100,000	100%	$ 100,000
L-13	Widen and install center turning lane along Westside Avenue	$ 9,800,000	100%	$ 9,800,000
L-14	Connect 43rd St. over the railroad from Westside Avenue to Tonnelle Avenue	$ 21,300,000	100%	$ 21,300,000
L-15	Intersection improvement at 83rd St. & Westside Ave.	$ 900,000	100%	$ 900,000
L-16	NJ 7 ITS Metering at Wittpenn Bridge	$ 3,000,000	70%	$ 2,100,000
	TOTAL	**$ 321,863,500**		**$ 159,113,995**

2. Intersections

Chapter III identified several intersection improvements to address future conditions. These improvements include adding or widening lanes, re-striping, new signals, new signal equipment, and signal timing changes. The analysis also identified existing needs and potential improvements to meet those needs. All the projects included here are attributable solely to future needs, and their entire costs will be subject to the impact fee assessment process. These future projects address the incremental need under the future condition, assuming the improvements to meet existing needs are constructed.

These cost estimates are based on historical data/costs from previous NJDOT and northern New Jersey intersection construction projects with similar scopes of work as the projects identified. The estimates include engineering, right-of-way, and construction costs. Each estimate also includes any additional costs that an intersection might require for "special conditions" such as steep slopes, additional right-of-way, or environmental issues. Table IV-6 shows the cost model assumptions for the intersection improvements.

Table IV-6: Cost Factors for Intersection Improvements

Element	Cost
New signal	$250,000
Signal and controller revisions for interconnection	$ 98,000
100' of left-turn lane	$114,000
100' of right-turn lane	$128,000
Signal retiming	$ 3,000

Table IV-7 summarizes the estimated costs to improve intersections for the future.

Table IV-7: Candidate Intersection Improvements and Cost Estimates

Ref #	Intersection	Improvement	Estimated Future Cost
I-1	US 46 & Industrial Avenue	Signal cycle and split timing improvement & turning storage lanes	$ 712,000
I-2	Westside Avenue & 69th Street	Signal split timing improvement	$ 3,000
I-3	Westside Avenue & Paterson Plank Road	Grade separate westbound Paterson Plank Rd. to northbound Westside Ave. movement and southbound Westside Ave. to westbound Paterson Plank Rd. movement	$ 4,032,000
I-4	Murray Hill Parkway & E. Union Avenue	Intersection signalization and storage lanes	$ 498,000
I-5	Paterson Plank Road & Harmon Meadow Boulevard	Turning movement storage lanes	$ 605,000
I-6	County Avenue & Secaucus Road	Signal split timing improvement & turning movement storage lanes	$ 801,600
I-7	County Avenue & Center Avenue	Turning movement storage lanes	$ 85,500
I-8	County Ave. & Paterson Plank Rd	Turning movement storage lanes	$ 1,046,000
I-9	Paterson Plank Rd & Humboldt St	Signal phasing and split timing improvement & turning movement storage lanes	$ 248,000
I-10	Meadowlands Parkway & Harmon Plaza	Signal split timing improvement & turning movement storage lanes	$ 629,000
I-11	Center Street & 10th Street	Signal split timing improvement	$ 3,000
I-12	Paterson Plank Road & 1st Street	Signal phasing and split timing improvement & turning movement storage lanes	$ 376,000
I-13	American Way & Meadowland Parkway	Storage lanes	$ 1,280,000
I-14	Secaucus Road & Hartz Way	Turning movement storage lanes	$ 256,000
I-15	Meadowland Parkway & Seaview Drive	Storage lanes	$ 768,000
I-16	New County Road & Castle Road	Intersection signalization	$ 250,000
I-17	Polito Avenue & Rutherford Avenue	Signal split timing improvement & turning movement storage lanes	$ 640,000
I-18	Valley Brook Avenue & Clay Ave	Intersection signalization and storage lanes	$ 250,000
I-19	Meadowland Parkway & eastbound NJ 3 ramp	Signal split timing improvement & turning movement storage lanes	$ 1,259,000
	TOTAL		**$ 13,742,100**

3. Interchanges

The analysis presented in Chapter III also recommends several improvements to ramps and weave sections at roadway interchanges. Table IV-8 summarizes their estimated costs. The analysis identified no existing interchange improvement needs; thus, all identified projects are attributable solely to future conditions, and all costs will be subject to the fee assessment process. The methodology for estimating the costs of interchange improvements used the same factors as for the roadway segment improvements (see Table IV-4).

Table IV-8: Candidate Interchange Improvements and Cost Estimates

	Improvement	Estimated Future Cost
X-1	Deceleration lane at diverge ramp from eastbound NJ 3 to Meadowland Parkway	$ 3,825,000
X-2	Grade-separate to address weave along northbound NJ 17 between merge ramp from westbound NJ 3 service road and diverge ramp to eastbound NJ 3	$ 19,150,000
X-3	Extend merge ramp from eastbound Newark – Jersey City Turnpike to westbound I-280	$ 5,025,000
X-4	Add deceleration lane from eastbound NJ 3 to westbound Paterson Plank Rd.	$ 5,025,000
X-5	Extend merge ramp from NJ 17 to eastbound NJ 3	$ 4,525,000
X-6	Extend deceleration lane from westbound NJ 3 to northbound NJ 17	$ 4,000,000
X-7	Extend acceleration lane from southbound NJ 17 to westbound NJ 3	$ 12,700,000
X-8	Add weave lane along westbound NJ 3 between on ramp to northbound NJ 17 and off ramp to southbound NJ 17	$ 8,600,000
	TOTAL	**$ 62,850,000**

D. PEDESTRIAN

Chapter III recommends several pedestrian enhancement projects for the District involving the addition of sidewalks and crosswalks. The cost factors (obtained from the Federal Highway Administration's website) are as follows:

- $70 per linear foot of five-foot sidewalk, including curbing
- $300 for a painted ladder crosswalk

As with the public transit improvements, the process did not identify a separate set of improvements to meet existing pedestrian needs. The future share of the costs of the pedestrian improvements was based on the ratio of the existing Transit Score for the sub-area to the future Transit Score.

Table IV-9: Candidate Pedestrian Improvements and Cost Estimates

Ref #	Area	Number of Crosswalks	Length of Sidewalk (ft)	Total Cost	Future Share	Future Costs
P-1	Valley Brook Avenue	9	8,559	$ 601,440	52.9%	$ 318,162
P-2	Harrison Avenue	0	944	$ 66,000	37.3%	$ 24,618
P-3	Westside Avenue	15	14,542	$1,022,000	49.3%	$ 503,846
P-4	Paterson Plank Road	24	11,414	$ 806,000	26.6%	$ 214,396
P-5	New County Rd./Ext.	6	1,667	$ 576,430	43.7%	$ 251,900
P-6	Moonachie Avenue	18	1,674	$ 123,000	4.4%	$ 5,412
	TOTAL	**72**	**38,800**	**$3,194,870**		**$1,318,334**

E. BICYCLE

Chapter III also recommends several bicycle facility enhancements for the District. Each recommendation involves establishing a Class I (Off Road Path), Class II (On Road Striped Lanes), or Class III (Share the Road) bicycle route along the designated corridor. According to the 1999 standards as identified by the American Association of State Highway and Transportation Officials (AASHTO), Class I bicycle routes provide a completely separated right-of-way designated for the exclusive use of bicycles and pedestrians with cross-flows by motorists minimized. Such bike paths are usually 10 feet wide. Class II bicycle routes are made up of bike lanes that are typically 5 feet wide on the outer roadway, designated by a white paint stripe and either with painted bicycle symbols or bicycle route signs. Class III bicycle routes are located along an on-road, shared right-of-way designated by bike route signs and/or permanent markings.

Cost estimates for Class I and Class II bicycle facilities were determined by analyzing similar project costs per mile from improvements in areas surrounding the District. Project cost

information was obtained through the New Jersey Department of Transportation website. After carefully reviewing a number of similar Class I and Class II projects, it was determined that the average cost per mile for a Class I paved bicycle facility constructed in northern New Jersey would be approximately $500,000 per mile, while a Class I gravel path would cost approximately $300,000 per mile. Costs per mile for a Class II on road striped bike/travel lane would be cheaper at $125,000 per mile (striping only).

Costs for Class III bicycle route facilities include required signage for every 0.25 miles, at all signalized intersections, and at every turn, along with a vehicular travel lane at least 12 feet wide to accommodate both auto vehicles and bicycles in urban areas (source: AASHTO Guide for the Development of Bicycle Facilities, 1999). Bicycle route signs cost approximately $100 per sign and $20 per post (includes installation), for an approximate cost of $1,000 per mile for signs in both directions (source: planning group at the New York State Department of Transportation, Region 10 [Long Island]). Table IV-10 summarizes the cost estimates for each recommendation.

As with the public transit and pedestrian improvements, the process did not identify a separate set of enhancements to meet existing bicycle facility needs. The future share of the costs of the candidate bicycle improvements is also based on the ratio of the existing Transit Score for the sub-area to the future Transit Score.

Table IV-10: Candidate Bicycle Improvements and Cost Estimates

Ref #	Improvement Area	Route Milage	Estimated Cost	Future Share	Estimated Future Cost
B-1	Carlstadt	6.1	$ 728,100	9.7%	$70,626
B-2	East Rutherford	1.6	$ 287,500	71.7%	$206,138
B-3	Jersey City	1.1	$ 207,500	0.0%	$0
B-4	Kearny	1.8	$ 540,000	68.4%	$369,360
B-5	Little Ferry	1.2	$ 190,100	4.9%	$9,315
B-6	Lyndhurst	1.0	$ 195,000	98.8%	$192,660
B-7	Moonachie	3.0	$ 89,800	0.0%	$0
B-8	North Arlington	1.8	$ 540,000	23.2%	$125,280
B-9	North Bergen	2.1	$ 937,500	49.3%	$462,188
B-10	Rutherford	2.8	$ 925,000	34.2%	$316,350
B-11	Secaucus	5.5	$ 946,800	21.4%	$202,615
B-12	South Hackensack	0.4	$ 102,500	0.0%	$0
B-13	Teterboro	1.7	$ 212,500	13.8%	$29,325
	TOTAL	**30.1**	**$ 5,902,300**		**$1,963,883**

F. DISTRICT-WIDE PROGRAMS

The cost to conduct these programs is estimated per activity or on an annual recurring cost basis as outlined in Table IV-11. Each program is related to future, not existing, needs and issues.

Table IV-11: District-wide Program Cost Estimates

Ref #	Program	Cost Basis Unit	Cost Per Unit	Number of Units	Estimated Future Cost
D-1	Traffic Signal Timing	10 Intersections per year	$ 3,000	24 years	$ 720,000
D-2	Development Intersections and Signals	Access locations	various	20	$ 5,196,000
D-3	Signal Integration Program	Intersection	$ 98,000	15	$ 1,470,000
D-4	Planning Studies (transit, goods movement, bike/pedestrian, safety strategies)	Annual	$ 250,000	24 years	$ 6,000,000
D-5	Transportation Efficiency Credit Program	Percent of Private share of projects	N/A	15%	$ 3,283,982
D-6	Incident Management	Initiative	$ 500,000	5	$ 2,500,000
D-7	Traffic Count Program	20 Counts per year	$ 2,500	24 years	$ 1,200,000
D-8	Transportation Model Updates	Update	$ 120,000	6	$ 720,000
D-9	Program Administration	Annual	$ 150,000	24	$ 3,600,000
	TOTAL				**$ 24,689,982**

V. RECOMMENDED IMPROVEMENTS

A. INTRODUCTION

Chapters III and IV presented a full range of candidate transportation improvements in all modes and sub-elements of the transportation system, including estimated costs. In further development of the MDTP, this set of candidate improvements was reviewed in the context of their estimated effectiveness and fiscal considerations to determine which improvements justify imposing impact fees upon private developers in the Meadowlands District. The primary objective in this review was to identify and recommend for inclusion in the MDTP improvements that provide improved mobility or accessibility, including intermodal and modal connectivity, of benefit to the new private sector development in the District.

The process for evaluating the candidate improvements used the following three factors in a sequential screening process:

- Does the improvement enhance travel options and multi-modal connectivity?
- Does the improvement provide a direct benefit to travel within the District?
- Is the improvement cost-effective?

This screening process led to the following results at each step:

1. Multi-modal -- all candidate transit, pedestrian, and bicycle improvements become recommended projects.
2. District benefits - all interchange and intersection improvements and some segment improvements remain candidate improvements.
3. Cost effectiveness -- all intersection improvements and some segment improvements become recommended projects.

Table V-1 is a summary of the results of the evaluation. In sum, all candidate public transit, pedestrian, and bicycle improvements are recommended projects; some candidate roadway segment improvements are recommended; no candidate roadway interchange improvements are recommended; and all candidate intersection improvements are recommended. Appendix V-A provides more details on the specific criteria used in the screening process.

Table V-1: Evaluation Summary

Category	Multi-Modal	District Benefit	Cost Effective	Recommended
Transit	**Yes**	**Yes**	**Yes**	**x**
Pedestrian	**Yes**	**Yes**	**Yes**	**x**
Bicycle	**Yes**	**Yes**	**Yes**	**x**
Links (a)	-	No	No	-
Links (b)	-	Yes	No	-
Links (c)	-	No	Yes	-
Links (d)	-	**Yes**	**Yes**	**x**
Interchanges	-	Yes	No	-
Intersections	-	**Yes**	**Yes**	**x**

This review process led to identifying a smaller set of recommended transportation improvements that will be the basis for the Plan (see Figure V-1). In general, these improvements include all candidate intersection, public transit, pedestrian, and bicycle projects (candidate segment or interchange improvements are not included). The total estimated costs of all recommended improvements are $95.4 million, and the total costs of improvements attributable to future development are $63.1 million (see Table V-2).

Table V-2: Estimated Costs of Recommended Transportation Improvements

	Total Costs	Future Costs
Public Transit	$ 41,200,000	$ 15,701,000
Roads	$ 20,405,600	$ 19,450,095
Pedestrian	$ 3,194,870	$ 1,318,334
Bicycle	$ 5,902,300	$ 1,983,856
District-wide Programs	$ 24,689,982	$ 24,689,982
TOTAL PROGRAM COSTS	**$ 95,392,752**	**$ 63,143,267**

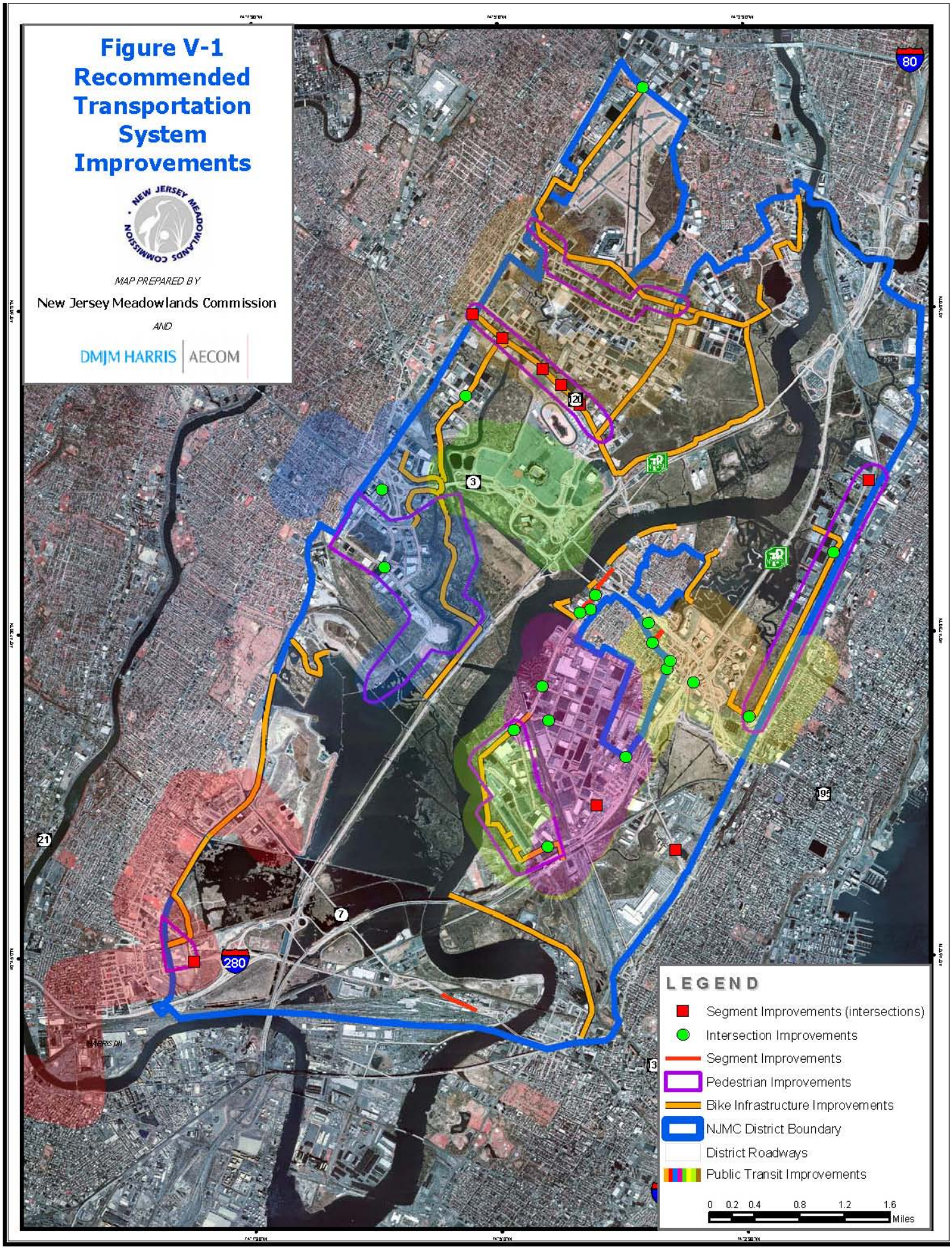


Figure V-1
Recommended
Transportation
System
Improvements
NEW JERSEY MEADOWLANDS COMMISSION
MAP PREPARED BY
New Jersey Meadowlands Commission
AND
DMJM HARRIS | AECOM
80
21
3
7
280
LEGEND
Segment Improvements (intersections)
Intersection Improvements
Segment Improvements
Pedestrian Improvements
Bike Infrastructure Improvements
NJMC District Boundary
District Roadways
Public Transit Improvements
0 0.2 0.4 0.8 1.2 1.6
Miles

The following sections provide a summary of the recommended improvements by category.

B. PUBLIC TRANSIT

Chapter III proposed six new shuttle services for the District. These shuttles would serve the sub-areas of Kearny, Secaucus (three routes), Lyndhurst/Rutherford, and Carlstadt/Moonachie. The recommended improvements include all of these services due to their intended specific orientation to support areas of new development/redevelopment. These are all described in section B of Chapter III.

C. ROADWAYS

Chapter III proposed roadway improvements in three categories: roadway segments, intersections, and interchanges. The recommended improvements include all proposed intersection improvements identified in Chapter III, no proposed interchange improvements, and the proposed segment improvements in Table V-3.

Table V-3: Recommended Segment Improvements

#	Improvement
L-1	Operational improvements at intersection of Bergen Ave. & Newark-Jersey City Turnpike
L-6	Intersection operational improvements along NJ 120
L-9	Reallocate cartway to provide second lane southbound
L-10	Intersection operational improvements along Meadowland Parkway
L-11	Intersection operational improvements along County Avenue
L-12	Intersection improvements at Secaucus Road & Postal Service Road
L-15	Intersection improvement at 83rd St. & Westside Ave.
L-16	NJ 7 ITS Metering on approaches to Wittpenn Bridge

These segment improvements are recommended because they are relatively small in scale and cost, are mostly on non-freeway and minor arterial or lower classification roadways, and can accommodate a relatively large proportion of local traffic.

D. PEDESTRIAN AND BICYCLE

Sections D and E in Chapter III identify proposed improvements for pedestrian and bicycle facilities, respectively. The recommended improvements include all these proposals.

E. DISTRICT-WIDE PROGRAMS

All of the district-wide initiatives proposed in Chapter III are recommended for the Plan and are listed in Table V-4.

Table V-4: Recommended District-Wide Programs

Ref #	Improvement
D-1	Traffic Signal Timing
D-2	Development intersections/signals
D-3	Signal Integration Program
D-4	Planning Studies (transit, goods movement, bike/pedestrian, safety strategies)
D-5	Transportation Efficiency Credit Program
D-6	Incident Management
D-7	Traffic Count Program
D-8	Transportation Model Updates
D-9	Program Administration

F. STAGING PLAN

The last element of the recommended improvements is a schedule for staging the improvements over the next 24 years. The proposed staging plan includes five stages, each stage lasting five years except for the last stage, which is only four years long (see Table V-5). This schedule provides the starting point for developing the financial plan, which addresses projected revenues and expenses for the identified projects (see Chapter VII).

The staging results from a process that rated the importance of the identified improvements to the performance of the overall transportation system. The NJMC assigned the highest priority

to all candidate public transit, pedestrian, and bicycle improvements. The rating system for the roadway improvements is based on two factors: the severity of the future problem and the functional classification of the roadway. The highest ratings went to the most severe problems (based upon V/C ratio or delay) and the highest functional classifications (freeways and principal arterials). The rating process assigned improvements with the highest ratings to the earliest stages. Appendix V provides more details on the rating process.

The staging schedule identifies that one complex roadway improvement that will extend over two stages (10 years), with a sequential duration of 7-10 years. This project may include as many as seven distinct phases of development: concept development, feasibility assessment, alternatives analysis, design, permitting, bidding, and construction. It is anticipated that less complex roadway improvements (along with transit shuttles and pedestrian and bicycle enhancements) will not require extensive concept development, feasibility assessment, or alternatives analysis and thus should occur within a single 5-year stage, with costs being distributed over all stages. The improvement staging schedule will be reassessed and revised to reflect the availability of District revenues from development fee assessments over the stages. These changes will be presented in Chapter VI.

Table V-5: Staging Plan for Identified Improvements

Ref #	Improvement	Description	Stage I	Stage II	Stage III	Stage IV	Stage V
	Stage I						
I-13	Paterson Plank Road & 1st Street	Signal phasing and split timing improvement & turning movement storage lane additions	x				
I-17	New County Road & Castle Road	Intersection signalization	x				
I-18	Polito Avenue & Rutherford Avenue	Signal split timing improvement & turning movement storage lane additions	x				
T-1	Kearny area	Shuttle bus service	x	x	x	x	x
T-2	Lyndhurst/Rutherford area	Shuttle bus service	x	x	x	x	x
T-3, 4 & 5	Secaucus area	Shuttle bus service	x	x	x	x	x
T-6	Carlstadt/Moonachie area	Shuttle bus service	x	x	x	x	x
P-1	Valley Brook Avenue area	Pedestrian improvements	x				
P-2	Harrison Avenue area	Pedestrian improvements	x				
P-3	Westside Avenue	Pedestrian improvements	x				
P-4	Paterson Plank Road	Pedestrian improvements	x				
P-5	New County Road/New County Road Extension area	Pedestrian improvements	x				
P-6	Moonachie Avenue and vicinity	Pedestrian improvements	x				
B-1	Carlstadt	Bicycle route	x	x			
B-2	East Rutherford	Bicycle route	x	x			
B-3	Jersey City	Bicycle route	x	x			
B-4	Kearny	Bicycle route	x	x			
B-5	Little Ferry	Bicycle route	x	x			
B-6	Lyndhurst	Bicycle route	x	x			

Ref #	Improvement	Description	Stage I	Stage II	Stage III	Stage IV	Stage V
	Stage I						
B-7	Moonachie	Bicycle route	x				
B-8	North Arlington	Bicycle route	x				
B-9	North Bergen	Bicycle route	x	x			
B-10	Rutherford	Bicycle route	x				
B-11	Secaucus	Bicycle route	x				
B-12	South Hackensack	Bicycle route	x				
B-13	Teterboro	Bicycle route	x				
	Stage II						
I-1	NJ 46 & Industrial Avenue	Signal cycle and split timing improvement & turning movement storage lane additions		x			
I-3	Westside Avenue & Paterson Plank Road	Grade separation		x	x		
I-4	Murray Hill Parkway & E. Union Avenue	Intersection signalization and storage lanes		x			
I-11	Meadowland Parkway & Harmon Plaza	Signal split timing improvement & turning movement storage lanes		x			
I-16	Meadowlands Parkway & Seaview Drive	Storage lanes		x			
	Stage III						
L-11	County Ave. btw Metro Way and Jefferson Ave.	Intersection improvement			x		
L-12	Secaucus Rd. btw US 1&9 and Postal Service Rd.	Intersection improvement			x		
L-16	NJ 7 west of Wittpenn Bridge	Metering of westbound traffic on to bridge			x		
I-9	County Avenue & Paterson Plank Road	Turning movement storage lanes			x		
I-14	American Way & Meadowland Pkwy	Storage lanes			x		
I-20	Meadowland Parkway & eastbound NJ 3 ramp	Signal split timing improvement & turning movement storage lanes			x		

Ref #	Improvement	Description	Stage I	Stage II	Stage III	Stage IV	Stage V
	Stage IV						
L-1	Bergen Avenue and Newark-Jersey City Turnpike and Schuyler Avenue	Intersection improvement				x	
L-6	Meadowland Parkway	Intersection improvements				x	
L-9	Plaza Center between NJ 3 and Paterson Plank Road	Reallocate cartway to provide second lane southbound for combined through and left turn traffic				x	
L-15	83rd Street & Westside Avenue	Intersection improvement				x	
I-2	Westside Avenue & 69th Street	Signal split timing improvement				x	
I-6	Paterson Plank Road & Harmon Meadow Boulevard	Turning movement storage lanes				x	
I-7	County Avenue & Secaucus Road	Signal split timing improvement & turning movement storage lanes				x	
I-8	County Avenue & Center Avenue	Turning movement storage lanes				x	
I-10	Paterson Plank Road & Humboldt Street	Signal phasing and split timing improvement & turning movement storage lanes				x	
	Stage V						
I-15	Secaucus Road & Hartz Way	Turning movement storage lanes					x
I-19	Valley Brook Avenue & Clay Avenue	Intersection signalization and storages					x
I-12	Center Street & 10th Street	Signal split timing improvement					x
L-10	Meadowland Parkway between NJ 3 and Broadcast Plaza	Intersection operational improvements along Meadowland Parkway					x

VI. COST ALLOCATION AND FEE ASSESSMENT

A. FEE ASSESSMENT FRAMEWORK

This chapter describes the process for allocating transportation improvement costs among public and private responsibilities and presents a formula to calculate fees that will be assessed on District growth. The type and number of vehicle trips generated by development determines the cost allocation.

The process used to complete the cost allocation and non-exempt development assessment fee framework includes the following:

- Methodology for allocating costs of projects to public and private shares
- Adjustments and impacts to assessments based on exemptions
- Methodology for assessing private share costs among new developments
- Formula for calculating costs per vehicle mile traveled
- Calculation of specific fees for development projects
- Adjustments and impacts to assessments based on credits.

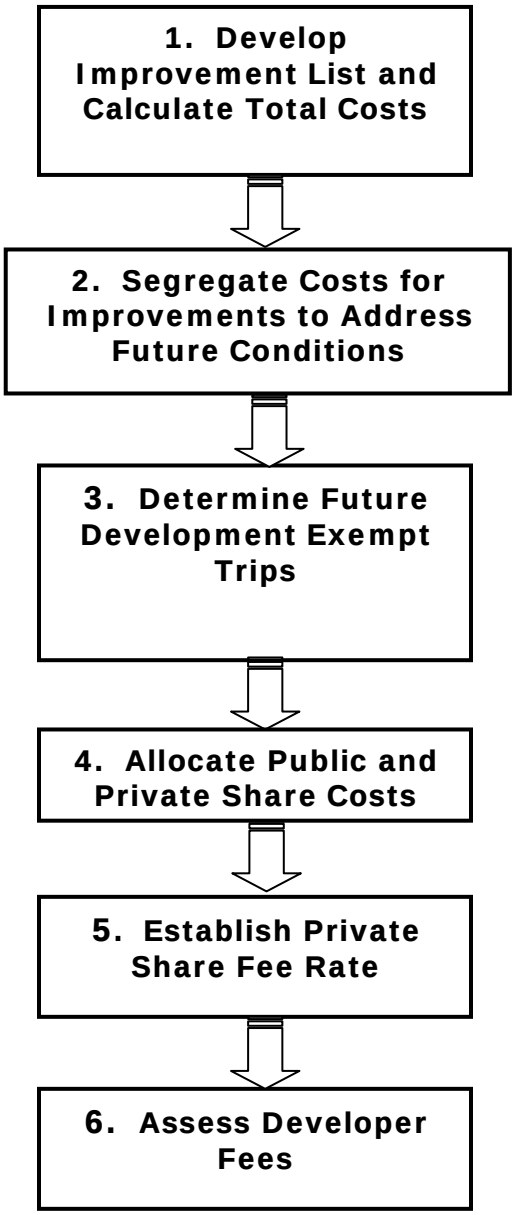
The proposed formula takes into account the effect of vehicle trips originating within the District on all multi-modal improvements. It accounts for the impacts of various lengths of trips generated by future private development on the need for transportation improvements at the aggregate level of the total transportation system throughout the District.

Basing the impact fee on new growth trips makes it possible to create a much better fair-share fee system. The cost is based on the anticipated use of the improvements by all new trips. The cost allocation method enables the collection of fees from developers whose developments use District roads and transportation services that need improvements.

The following sections describe the steps in this process.

1. Develop Improvement List and Calculate Total Costs

Chapter V presented the recommended transportation improvements and associated costs. The total estimated cost of the improvements is $94.3 million.



2. Segregate Costs for Improvements to Address Future Conditions

The cost estimating process also identified the proportion of costs needed to address existing deficiencies and eliminated these costs from the total costs as appropriate for each type of improvement. This process thereby identified the total cost of improvements necessary to address future conditions.

These calculations found that about $28.3 million of the total cost of improvements is attributable to existing traffic deficiencies. The remaining $66 million of improvement costs are attributable to future growth in the District.

3. Determine Future Development Exempt Trips

The number of development projects and the corresponding number of vehicle trips generated by those properties that are exempt from the fee assessment program were determined as follows.

a. Mandated Exempt Development

The enabling legislation mandates that certain developments are exempt from fee assessment under this program. Mandated exempt properties are as follows:

- Low- and moderate-income housing units as defined in the Act
- Developments that were issued a zoning certificate prior to the adoption of the fee assessment resolution
- Any development that has an approved development agreement with the governing State agency or municipality within the district having primary jurisdiction over the development or for which construction of a material portion of the development has commenced after the date on which a development agreement was executed

The majority of mandated exemptions, unlike credits or the discretionary exemptions, become the responsibility of the individual developments and/or public sector. The NJMC reviewed anticipated future development and redevelopment locations, expected uses, and square footages to determine which properties in the District, with their corresponding trip generation, would be exempt from the fee assessment process. The NJMC has identified fifteen development proposals (including mandated exemptions and other proposals not subject to NJMC jurisdiction) that meet these criteria. These development proposals are listed in Appendix VII.

b. De Minimis Exemptions

The enabling legislation also provides for fee exemption or fee reduction when the NJMC determines that a specified land use will have a beneficial, neutral, or minor adverse impact on transportation. Since, by definition, such uses would not affect the total number of trips generated in the District, such exemptions do not affect the allocation of total future costs and assessments. Land uses that do not create an impact on facilities and services, or that are deemed de minimis, include the following:

1. Alteration or expansion of an existing structure that does not add any residential units
2. Alteration or expansion of nonresidential structures that do not expand the gross floor area by more than 100 square feet
3. Miscellaneous improvements, including, but not limited to, fences, walls, signs, and residential swimming pools
4. Demolition or removal of a structure

5. Replacement of a residential structure with a new residential structure of the same number of dwelling units at the same site or lot when a completed application for Zoning Certificate for the replacement is approved within 12 months of the demolition or destruction of the residential structure
6. Replacement of a non-residential structure with a new non-residential structure of the same size and use at the same site or lot when a completed application for the Zoning Certificate for the replacement is approved within a designated period of the demolition or destruction of the nonresidential structure. A replacement non-residential structure is considered to be the same size as the prior non-residential structure if the gross floor area of the building will not be increased by more than a designated square footage, generally ranging from 100-500 square feet.

4. Allocate Public and Private Share Costs

As noted, the total costs for the recommended transportation improvements to address future transportation needs are $66 million. These costs were allocated between public and private responsibility in the following steps:

1. The travel demand model provided the total number of future A.M. and P.M. peak hour trips generated. The model disaggregated the trips into the categories associated with the source of the future travel as follows:
   a. New non-exempt development and net redevelopment total = 29,219 trips
   b. Development trips from exempt District parcels = 26,489 trips
   c. 2030 background traffic in the District generated outside the District boundaries = 17,383 trips
2. The percentage allocation to calculate private development cost varied based upon the specific mode of transportation of the improvement. The allocation for roadway needs was then developed by dividing the total trips subject to fee assessment (non-exempt development trips and net redevelopment trips) by the total trips. This calculation indicates that the private share of future roadway transportation improvement costs should be 39.98%. The allocation for bicycle needs was then developed by dividing the total trips subject to fee assessment (non-exempt development trips and net redevelopment trips) by

the total development related trips. This calculation indicates that the private share of future bicycle and pedestrian improvement costs should be 52.45% (see Table VI-1).

Table VI-1: Calculation of Private Share Allocation of Roadway, Bicycle, and Pedestrian Improvements

	Portion of Future Trips	
A	Non-exempt development trips and net redevelopment trips	29,219
B	Exempt District trips	26,489
C	External – External trips	17,383
D	Total Development Trips (A + B)	55,708
E	Total Trips (A + B + C)	73,091
Private Development Share of Future Pedestrian and Bicycle Needs (A/D)		0.5245
Private Development Share of Future Vehicular Needs (A/E)		0.3998

This private share allocation of just under 40% will be applied to all roadway categories of improvements, while the private share allocation of 52.45% will be applied to all bicycle and pedestrian improvements. The private share of transit funding was calculated individually for each route based upon the proportion of trips attributable to total new development to trips attributable to new development that is exempt from the assessment. (see Table VI-2)

Table VI-2: Calculation of Private Share Allocation of Transit Improvements

	Shuttle Route	Non-Exempt Trips A	Exempt Trips B	Total Trips C	Private Share (A/C)
T-1	Kearny area shuttle	3,194	415	3,609	0.8850
T-2	Lyndhurst / Rutherford area shuttle	2,929	2,466	5,395	0.5429
T-3	Secaucus Transit Village area shuttle	3,248	0	3,248	1.0000
T-4	Secaucus area shuttle	1,398	629	2,027	0.6896
T-5	Secaucus - North Bergen shuttle	4,031	601	4,632	0.8703
T-6	Carlstadt -Moonachie area shuttle	7,319	0	7,319	1.0000

For development intersections and program administration the private share is 100%.

The result is that $38.2 million, of the total future costs of $63.1 million, will be subject to fee assessment attributable to non-exempt development and redevelopment. (see Table VI-3)

Table VI-3: Calculation of Total Private Share

Ref	Improvement	Future Cost	Private Share Proportion	Private Share Cost
T-1	Kearny area shuttle	$ 5,133,200	0.8850	$ 4,542,882
T-2	Lyndhurst / Rutherford area shuttle	$ 3,788,400	0.5429	$ 2,056,722
T-3	Secaucus Transit Village area shuttle	$ 1,272,600	1.0000	$ 1,272,600
T-4	Secaucus area shuttle	$ 2,484,600	0.6896	$ 1,713,380
T-5	Secaucus - North Bergen shuttle	$ 2,484,600	0.8703	$ 2,162,347
T-6	Carlstadt -Moonachie area shuttle	$ 537,600	1.0000	$ 537,600
L	Road Links	$ 5,707,995	0.3998	$ 2,282,056
I	Road Intersections	$ 13,742,100	0.3998	$ 5,494,092
P	Pedestrian	$ 1,318,334	0.5245	$ 691,466
B	Bicycle	$ 1,983,856	0.5752	$ 1,140,070
D	D-1, D-3, D-4, D-5, & D-6	$ 13,973,982	0.3998	$ 5,586,798
D	D-2, D-7, D-8, & D-9	$ 10,716,000	1.0000	$ 10,716,000
	TOTAL	**$ 63,143,267**		**$ 38,196,014**

The remaining $24.9 million of future improvement costs and all of the $32.2 million of improvement costs determined to be attributable to existing deficiencies (total $57.2 million) will be the public share cost of future improvements (see Table VI-2). This public share will be the funding responsibility of other agencies including the NJDOT, NJ TRANSIT, Hudson and Bergen Counties, and District municipalities.

Under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) requirements, a state's annual list of projects must include investments made in pedestrian walkways and bicycle transportation facilities. As a result, these types of projects are being emphasized by regional, state, and national transportation agencies (e.g. NJTPA, NJDOT, and USDOT). As such, NJMC may pursue project funding through NJDOT and NJTPA.

Table VI-4: Summary of Allocation of Public and Private Costs

Breakdown of Recommended Improvement Costs			
A	Existing development	$	32,249,486
B	Future public	$	24,947,253
	Total Public Share (A + B)	**$**	**57,196,738**
C	Future private	$	38,196,014
	Total estimated (A + B + C)	**$**	**95,392,752**

5. Establish Private Share Fee Rate

The next step in the assessment framework is to determine a private share fee rate for traffic generated by new development. The NJMC will assess a fee based upon the total future private share of improvements ($38.2 million) divided by the total morning and evening peak hour vehicle miles of travel generated by non-exempt development and net redevelopment. That is, the future development and redevelopment trips generated by each land use type are multiplied by a trip length factor, derived in the next section, to determine the vehicle miles of travel associated with each development. Table VI-5 summarizes the calculation of total peak hour vehicle miles traveled subject to fee.

Table VI-5: Calculation of Peak Hour VMT Subject to Fee

Land Use	2030 Net Growth		Peak Trips	x VMT Factor	= Total VMT
Warehouse	3,989,000	sf	3,123	7.25	22,642
Office	1,670,000	sf	4,779	5.92	28,292
Retail	4,096,000	sf	9,200	4.98	45,816
Specialty Retail	640,000	sf	4,641	4.98	23,112
Hotel	1,016	room	1,138	3.73	4,245
Condo	2,409	unit	1,722	6.22	10,711
				Total Peak Hour VMT subject to Fee	**134,818**

Table VI-6 summarizes the calculation of the per vehicle mile of travel fee. Based upon this calculation, the Plan proposes to establish a one-time fee of $283.32 per peak hour vehicle mile of travel (VMT).

Table VI-6: Calculation of Fee per Vehicle Mile

A	Total Estimated Future Private Share Cost of Improvements	$ 38,196,014
B	Total Peak Hour VMT subject to Fee	134,818
	Fee per VMT (A / B)	**$ 283.32**

6. Assess Developer Fees

The fees assessed to development in the District will be based on the peak hour trip generation formulae developed by the Institute of Transportation Engineers (ITE) for applicable land uses as described in the NJMC implementing resolution and subsequent regulations. These rates will be consistent with the land use types and rates applied in the modeled trip generation.

To calculate the fee to assess to a specific development, the NJMC will determine the appropriate ITE trip generation category(ies) for the proposed development project. The total number of units or square footage, as applicable, will be used in the A.M. and P.M. peak hour trip generation formulae for the identified land use to determine the total number of peak hour trips for each development. Total existing, pass-by, diverted, and internal trips will be reduced from the trip generation total in accordance with applicable ITE standards as stated in the latest version of the ITE Trip Generation Handbook. The total trips for the development are then multiplied by the appropriate land use average trip length factor and the fee rate to produce the fee obligation for the development. The following is a summarization detailing the derivation of trip length factors for individual land uses within the District.

Using data derived from the model, the average trip length for new future trips in the District is calculated in Table VI-7 below.

Table VI-7: Average Future Trip Lengths for Meadowlands District

	Vehicle Miles Traveled (VMT) from NJMC Model	(Miles)
A	Build (2030) plus Transit Improvements	1,948,858
B	Current (2006) plus Committed	1,493,684
C	Vehicular Miles of Future Travel (A-B)	455,174
D	Total Future Trips	73,091
E	Average Meadowlands District Trip Length (C/D)	6.23
F	Average National Trip Length	10.03
G	**Localization Factor for Trips Lengths (E/F)**	**0.62**

The localization factor for the District is applied to national average trip lengths as reported in the United States Department of Transportation *2001 National Household Transportation Study* in Table VI-8 below.

Table VI-8: Average Trip Lengths for Major Trip Types

	Average Trip Lengths (Miles)	
Trip Types	National	Meadowlands District
All Trips	10.03	6.22
To/From Work	12.11	7.51
Work Related Business	28.26	17.52
Shopping	7.02	4.35
Personal Business	7.84	4.86
School &Church	6.00	3.72
Social & Recreational	11.36	7.04

The resulting localized average trip lengths for various trip types are then converted to average trip lengths for various land use types by utilizing proportions of the trip types listed in Table VI-8. Short trip reduction factors for specific land use types were then applied, resulting in the overall average trip length factor that will be applied to trips due to new in-District development. Short trip reductions affect convenience, neighborhood, local and community trips. These trips tend to be shorter than the average trip as described in the Urban Land Institute *1992 Professional Real Estate Development* publication. The average trip length factors for ITE land use categories are detailed in Table VI-9 below.

Table VI-9: Average Trip Lengths Factors

Land Use Type (ITE Code)	Proportion of Trip Types	Short Trip Reduction Percent1	VMT Factor (Miles per Trip)
Port and Terminal (000):			
Terminals (010-030)	80% Work and 20% Average	-	7.25
Train and Bus Stations (090-093)	50 % Work and 50 % Average	-	6.87
Industrial (100):	80% Work and 20% Average		7.25
Mini-Warehouse (151)		40%	4.35
Residential (200):	100% Average		6.22
Care Facility (253-255) (50% Work)	50% Average and 50% Work	-	6.87
Lodging (300):	100% Average	40%	3.73
Recreational (400):	100% Recreational		7.04
Recreational Area/Park (411-418)		20%	5.63
Recreational Facility (435)		60%	2.82
Institutional (500):	100% School & Church		3.72
Elementary School (520)		60%	1.49
Middle School (522)		40%	2.23
Day Care (565)		80%	0.74
Medical (600):	100% Personal Business		4.86
Office (700):	60% Personal Business and 40% Work		5.92
Retail (800):	80% Shopping and 20% Work		4.98
Convenience Market (851-853)		80%	1.00
Services (900):	80% Shopping and 20% Work	60%	1.99
Fast Food (933-935)		80%	1.00
Service Station (944-946)		80%	1.00
Bank (911-912)		80%	1.00

Notes:
1. Short trip reductions applied: 80% for convenience trips, 60% for neighborhood trips, 40% for local trips, and 20% for community trips.

Table VI-10 provides examples of trip generation and fee calculations for several major land use types, based upon applying the trip generation formulae, trip length factors, and fee rate.

Table VI-10: Examples of Fees for Major Land Use Types

Land Use	ITE Land Use Code	Size	Peak Trips	VMT Factor	VMT	VMT Rate	Total Fee
Warehouse	150	100,000 sf	148	7.25	1,073	$ 283.32	$304,002
Residential	230 (Condo / Townhouse)	100 du	112	6.22	697	$ 283.32	$197,474
Office	710 (General Office)	100,000 sf	378	5.92	2,238	$ 283.32	$634,070
Retail	820 (Shopping Center)	100,000 sf	463	4.98	2,306	$ 283.32	$653,336

The NJMC implementing resolution and subsequent regulations will provide a procedure for review and appeal of assessed fees. The fee assessment formula and fee rate calculation will require periodic updating as both transportation and development conditions change over time. On an annual basis, the Consumer Price Index for the Northeast Urban Series will be used each February to modify fee rates across the board, applying the Index change released January of the same year. In addition, the completion of transportation improvements will identify cost differentials from those estimated for the initial concepts identified in this first MDTP. Levels, types, and locations of future development within the District will also evolve. Future Plan updates will include a review of the parameters, but the NJMC may need to reset certain selective elements on an interim basis between each Plan update.

B. APPLICATION OF CREDITS

Two types of credits may be applied against developer fee assessment payments.

1. Credits for construction or right-of-way contribution

If a developer has directly constructed elements of the transportation plan or has provided contributions to off-site right-of-way to support plan elements, the developer may apply for credit in lieu of the required fee.

2. Transportation Efficiency Credits for completing development elements consistent with the objectives of the HMTPD Act.

The developer may receive a credit against the required developer fee assessment payments if the following three statements are true:

a. The Applicant applies for the credit at or in advance of zoning certificate approval for the development.
b. Elements ***that are not otherwise required through regulations or the zoning certificate review process***.
c. The NJMC has deemed these elements to be consistent with transportation-efficient land uses that reduce automobile dependency, improve pedestrian and bicyclist safety, and encourage alternatives to peak-hour automobile trips.

The goal of the Transportation Efficiency Credit Program is to promote and encourage transportation-efficient land uses, thereby reducing automobile usage. These improvement elements would reduce the number of single-occupancy vehicle trips, thereby lessening the need for additional transportation improvements. For this reason, the trip credits are not included as a reduction of private trips in the fee assessment equation. Instead, they are apportioned between public and private shares as a transportation improvement included in the overall improvement program. The plan includes $3.3 million (2007) for this program. The rationale for the discounts is that such developments and programs reduce trips and thus the impact of those trips on the regional road network. The total discount will be apportioned at an average rate of $136,800 per year, with unused allocations added to subsequent years' discounts to fund future eligible projects. Table VI-10 lists the projects and programs that the NJMC will consider for eligibility for a Transportation Efficiency Credit.

Table VI-11: Transportation Efficiency Credit Program Schedule

Developer Action Available	Credit
Land Use	
Construction of Transit Related Improvement	Varies
Construction of Transit-Oriented Development	15%
Construction of Infill Development	5%
Construction of High-Density Residential Development	3%
Parking Initiatives	
Provision of Preferential Parking for Carpools, Vanpools, and Carsharing programs. Developer commits to provide and maintain reserved close-in, secure, covered, or otherwise preferable parking spaces.	2%
Unbundling parking to separate the payment of parking from the payment of rent or purchase price for residential and commercial units	5%
Implementation of a cash-out parking program for employees	3%

C. PROCEDURES FOR APPLICATION OF CREDITS

1. Construction or Right-of-way Contribution

a. The applicant will be entitled to a credit against the fee assessment for the value of new construction he/she provides for system improvements to facilities and/or the value of any dedication of land for system improvements as stipulated in the regulations adopted by the NJMC to implement the District Fee Assessment program. The regulations will address and clarify the details regarding developer actions/expenditures eligible for credits in terms of inclusion of the improvement in the adopted Plan, assurances for construction quality, or terms of land dedication and transaction completion in advance of credit application.

b. No contribution credit will be given for improvements addressing on-site requirements.

c. The value of a credit for structures, facilities, or other improvements will be established by original receipts provided by the applicant for a transportation system improvement for which the District impact fee is being charged.

d. An NJMC-approved appraiser will establish the value of a credit for land, including right-of-way and easements, on a case-by-case basis. The appraiser must be licensed in good standing by the State of New Jersey for the category of the property appraised. The appraisal will be in accord with the most recent version of the Uniform Standards of Professional Appraisal Practice and will be subject to review and acceptance by the NJMC. The applicant shall pay for the appraisal and NJMC review.

e. The applicant will be entitled to a credit for the value of the land provided or actual costs of capital facility construction against the fee that would be chargeable under the formula provided by the MTPD Rate Schedule under the following conditions:

   i. The applicant actually provides transportation improvements that are identified in the MDTP;

   ii. The applicant has voluntarily agreed to provide land for facilities that are identified in the MDTP or to make improvements to existing facilities in the MDTP.

f. After receiving the receipts for improvements, and/or the appraisal value of land, the NJMC will provide the applicant with a certificate setting forth the dollar amount of the credit, the reason for the credit, the legal description of the site donated, where applicable, and the legal description or other adequate description of the project or development to which the credit may be applied. The applicant must sign, date, and return a duplicate copy of this

letter or certificate indicating their agreement to the terms set forth before the impact fee credit will be awarded. If the applicant fails to sign, date, and return this document within 60 calendar days, the credit will be forfeited.

g. If the amount of the credit is less than the calculated fee amount, the difference remaining will be chargeable as an impact fee and paid prior to Zoning Certificate approval. If the amount of the credit is greater than the amount of the impact fee due, the applicant will forfeit the excess credit. Credits are not transferable among separate Zoning Certificate applications.

h. A claim for a contribution credit will be processed by the NJMC as follows. Claims for credits must be submitted prior to Zoning Certificate application or approval, for which an impact fee will be due, and will be processed by the NJMC before payment of the impact fee is due. This will allow any credit authorized by the NJMC to reduce the amount of the impact fee. Claims for credits will not be allowed after Zoning Certificate approval. Any NJMC approved credit for a Revised Zoning Certificate will be refunded to the applicant prior to a revised Zoning Certificate approval.

i. Claims for credits that are submitted after Zoning Certificate approval for which an impact fee is due are considered to be waived and will be denied.

j. Determinations made by the NJMC staff pursuant to this section will be subject to the appeal process provided in the HMTPD Act, as described in Paragraph C below.

2. <u>Transportation Efficiency Credit Program</u>

a. The Applicant must make application to the NJMC for the Transportation Efficiency Credit at or before Zoning Certificate approval. To receive a Program credit, the project must be approved by NJMC as eligible. Projects with Zoning Certificate approval that are not applying for a Revised Zoning Certificate are not eligible.

b. The credit will be calculated when the developer enters into a Memorandum of Agreement (MOA) for construction of the approved project. The MOA shall include the developer's responsibility to posts bonds for the entire cost of the project. The MOA shall also include granting of the credit. Eligible projects must be completed prior to NJMC issuance of a

Certificate of Occupancy. Once it has been calculated, the amount of the credit will not increase for inflation or accrue interest.

c. Eligible projects may not be granted a credit if the funds available for the credit program have been exceeded.

D. APPEALS PROCESSES

The following appeals processes are in accordance with the Hackensack Meadowlands Transportation Planning District Act:

1. Any person who has been assessed a development fee may request in writing a reconsideration of the assessment and a hearing by an employee so delegated by the NJMC within 90 days of the receipt of notification of the amount of the assessment on the grounds that the NJMC or its officers or employees in issuing the assessment did not abide by the provisions of:

a. The Hackensack Meadowlands Transportation Planning District Act; or

b. The resolution adopted by the NJMC pursuant to the Act (C.13:17-104(b)).

2. A person may appeal to the NJMC any decision made in connection with the reconsideration of an assessment (C.13:17-105). Upon such an appeal, the NJMC shall review the record of the hearing and render its decision, which shall constitute an administrative action subject to review by the Appellate Division of the Superior Court.

VII. FINANCIAL PLAN

A. COST ALLOCATION

This Plan recommends improvements that will increase mobility and access to and within the District for employees, residents, and visitors to the various retail, recreational, sports, and entertainment venues. Each recommendation addresses a specific problem, deficiency, or opportunity based on a series of macro (regional) and micro (local) analyses. In addition, the collective effect will enhance the travel performance of the overall system.

Chapter V identifies a relative order among the improvements recommended for advancement in terms of the degree of urgency of the underlying need and the criticality or value to the travel network as a whole. It assigns priority across five stages for the period 2006 to 2030. Chapter IV estimates the cost of each improvement, totaling $94.3 million (2007 dollars) and allocates that improvement cost based on the existing and future conditions contributing to the need. Chapter VI establishes the mechanism for calculating and assessing the public and the private development responsibility for improvements, as well as the method for assessing future developers for their share of the future portion of the improvement costs.

This Financial Plan provides a refined staging of the improvements linked to the development fee revenues that will be collected during each five-period period of the Meadowlands District Transportation Plan, building from the priority staging established in Chapter V. It separates the total improvement cost first by the proportions for existing needs and future needs and then further divides the future needs portion into needs attributable to private development (new and redevelopment) and needs attributable to increases in travel associated with growth outside the District that will travel on the District network.

From this basis, the Financial Plan establishes the total public and private financial obligation. The total public obligation includes costs to meet existing and future travel needs not associated with District development and associated with exempt development as described in Chapter VI. The private share relates directly to the travel need generated by anticipated District development.

B. FINAL STAGING PLAN

The Financial Plan distributes the apportioned private-sector costs over each five-year stage of the Plan. Depending on the nature and scale of each recommended improvement, steps for completion vary in terms of the degree of detailed analysis necessary to produce a construction plan and build it. Implementation of the largest and most complex projects will include the following:

- Concept development (initial project-level planning to refine the definitions of improvements in this plan)
- Feasibility and alternatives analysis (consideration of options to the preliminary concept to determine feasibility and evaluation of which offers the best result relative to the need and effects on the environment and community)
- Design (preparation of construction plans)
- Construction

Most improvements in the Plan will require only a couple or none of these steps. For purposes of the staging schedule in Chapter V, two generalized phasing patterns were applied to all the improvements. Here, they are further segregated more discretely over time, reflecting the characteristics of each improvement.

The Financial Plan assigns the phasing of each improvement to one or more five-year stage of plan implementation. Each improvement phase is related to available District fee revenues to cover the private-sector obligation toward implementing it. This is accomplished by maintaining a running comparison of planned expenditures to anticipated revenues. As a result, some projects may be programmed for earlier or later advancement compared to the Chapter V staging to assure that revenues will be available for each stage and that a project, once initiated, will progress to completion as quickly as possible. At the close of the 2030 time frame of the Meadowlands District Transportation Plan, it is anticipated that all projects will be built and all revenue collected will be spent.

However, the Financial Plan assumes a regular annual stream of fee assessment revenue since, from the vantage point of today, the pace or timing of development and therefore of the

payment of fees by each developer is not known. This means that the actual revenue stream may well not be evenly paced over each year. In operating the MTPD, the NJMC will need to put in place detailed accounting procedures so that projects can be advanced or delayed based on the rate of revenue collection. Flexibility for managing the MTPD fund, both deposits and withdrawals, is available so that early construction of an improvement can be accomplished through loans to the fund or developer financing can be repaid with future revenues.

Table VII-1 presents the program for advancing each improvement in the Plan to completion over 24 years from the base year of 2006, through 2030, maintaining solvency relative to revenues and assuming no loans or other early construction agreements. It identifies the public-sector partner for funding each improvement and assumes that partner can provide its share of project funding under a project-specific Memorandum of Agreement with the NJMC when each phase of the project is ready to begin. The NJMC will need to work closely with each public sponsor to confirm or modify project specific implementation agreements to reflect the availability of public funds and to adopt the details of the final investment project as it evolves beyond the master planning level of definition attained in this Plan. A summary of the public funding programs in New Jersey is presented in Appendix VII.

Table VII-1: Financial Plan for Recommended Improvements – Staging Plan

Ref #	Improvement	Total Costs	Public Share	Private Share	Potential Funding Partner	Stage I	Stage II	Stage III	Stage IV	Stage V
	Public Transit									
T-1	Kearny Area	$8,200,000	$3,657,118	$4,542,882	Participating Businesses		$1,195,495	$1,195,495	$1,195,495	$956,396
T-2	Lyndhurst / Rutherford Area	$8,200,000	$6,143,278	$2,056,722	Participating Businesses		$541,243	$541,243	$541,243	$432,994
T-3	Secaucus Transit Village Area	$4,200,000	$2,927,400	$1,272,600	Participating Businesses		$334,895	$334,895	$334,895	$267,916
T-4	Secaucus Area	$8,200,000	$6,486,620	$1,713,380	Participating Businesses	$356,954	$356,954	$356,954	$356,954	$285,563
T-5	Secaucus / North Bergen Area	$8,200,000	$6,037,653	$2,162,347	Participating Businesses		$569,039	$569,039	$569,039	$455,231
T-6	Carlstadt / Moonachie Area	$4,200,000	$3,662,400	$537,600	Participating Businesses		$141,474	$141,474	$141,474	$113,179
	Road Segments									
L-1	Bergen Ave. & Newark - Jersey City Turnpike	$100,000	$78,811	$21,189	Hudson County		$21,189			
L-6	Route 120 corridor	$400,000	$240,080	$159,920	NJDOT	$159,920				
L-9	Plaza Center	$13,500	$11,503	$1,997	Secaucus		$1,997			
L-10	Meadowlands Parkway	$1,950,000	$1,170,390	$779,610	Hudson County					$779,610
L-11	County Ave. btw Metro Way and Jefferson Ave.	$200,000	$120,040	$79,960	Hudson County				$79,960	
L-12	Secaucus Rd. btw US 1&9 and Postal Service Rd.	$200,000	$60,020	$39,980	Hudson County				$39,980	
L-15	Westside Avenue and 83rd Street	$900,000	$540,180	$359,820	North Bergen					$359,820
L-16	Route 7 Metering	$3,000,000	$2,160,420	$839,580	NJDOT	$839,580				

Table VII-1: Financial Plan for Recommended Improvements – Staging Plan (continued)

Ref #	Improvement	Total Costs	Public Share	Private Share	Potential Funding Partner	Stage I	Stage II	Stage III	Stage IV	Stage V
	Road Intersections									
I-1	NJ 46 & Industrial Avenue	$712,000	$427,342	$284,658	NJDOT	$284,658				
I-2	Westside Avenue & 69th Street	$3,000	$1,801	$1,199	North Bergen		$1,199			
I-3	Westside Avenue & Paterson Plank Road	$4,032,000	$2,420,006	$1,611,994	Hudson County				$370,759	$1,241,235
I-4	Murray Hill Pkwy & East Union Avenue	$498,000	$298,900	$199,100	East Rutherford		$199,100			
I-5	Paterson Plank Road & Harmon Meadow Blvd.	$605,000	$363,121	$241,879	Hudson County				$241,879	
I-6	County Avenue & Secaucus Road	$801,600	$481,120	$320,480	Hudson County				$320,480	
I-7	County Avenue & Center Avenue	$85,500	$51,317	$34,183	Hudson County				$34,183	
I-8	County Avenue & Paterson Plank Road	$1,046,000	$627,809	$418,191	Hudson County				$418,191	
I-9	Paterson Plank Road & Humboldt Street	$248,000	$148,850	$99,150	Secaucus					$99,150
I-10	Meadowland Parkway & Harmon Plaza	$629,000	$377,526	$251,474	Secaucus					$251,474
I-11	Center Street & 10th Street	$3,000	$1,801	$1,199	Secaucus			$1,199		
I-12	Paterson Plank Road & 1st Street	$376,000	$225,675	$150,325	Hudson County	$150,325				
I-13	American Way & Meadowland Parkway	$1,280,000	$768,256	$511,744	Secaucus				$511,744	
I-14	Secaucus Road & Hartz Way	$256,000	$153,651	$102,349	Secaucus				$102,349	
I-15	Meadowland Parkway & Seaview Drive	$768,000	$460,954	$307,046	Secaucus	$307,046				
I-16	New County Road & Castle Road	$250,000	$150,050	$99,950	Hudson County	$99,950				
I-17	Polito Avenue & Rutherford Avenue	$640,000	$384,128	$255,872	NJDOT	$255,872				
I-18	Valley Brook Avenue & Clay Avenue	$250,000	$150,050	$99,950	Lyndhurst				$99,950	
I-19	Meadowland Parkway & Eastbound NJ 3 Ramp	$1,259,000	$755,652	$503,348	NJDOT					$503,348

Table VII-1: Financial Plan for Recommended Improvements – Staging Plan (continued)

Ref #	Improvement	Total Costs	Public Share	Private Share	Potential Funding Partner	Stage I	Stage II	Stage III	Stage IV	Stage V
	Pedestrian									
P-1	Valley Brook Avenue Area	$601,440	$434,564	$166,876	Lyndhurst	$166,876				
P-2	Harrison Avenue Area	$66,000	$53,088	$12,912	Hudson County	$12,912				
P-3	Westside Avenue	$1,022,000	$757,733	$264,267	North Bergen	$264,267				
P-4	Paterson Plank Road	$806,000	$693,549	$112,451	NJDOT	$112,451				
P-5	New County Road/New County Road Extension	$576,430	$444,308	$132,122	Hudson County	$132,122				
P-6	Moonachie Avenue Area	$123,000	$120,161	$2,839	Bergen County	$2,839				
	Bicycle									
B-1	Carlstadt Area	$728,100	$728,054	$46	Carlstadt	$46				
B-2	East Rutherford Area	$287,500	$188,913	$98,588	East Rutherford	$98,588				
B-3	Jersey City Area	$207,500	$207,500	$0	Jersey City	$0				
B-4	Kearny Area	$540,000	$213,116	$326,884	Kearny	$326,884				
B-5	Little Ferry Area	$190,100	$186,781	$3,319	Little Ferry	$3,319				
B-6	Lyndhurst Area	$195,000	$157,320	$37,680	Lyndhurst	$37,680				
B-7	Moonachie Area	$89,800	$89,800	$0	Moonachie	$0				
B-8	North Arlington Area	$540,000	$429,127	$110,873	North Arlington	$110,873				
B-9	North Bergen Area	$937,500	$493,800	$443,700	North Bergen	$399,330	$44,370			
B-10	Rutherford Area	$925,000	$903,262	$21,738	Rutherford	$21,738				
B-11	Secaucus Area	$946,800	$878,882	$67,918	Secaucus	$67,918				
B-12	South Hackensack Area	$102,500	$102,500	$0	South Hackensack	$0				
B-13	Teterboro Area	$212,500	$183,175	$29,325	Teterboro	$29,325				

Table VII-1: Financial Plan for Recommended Improvements – Staging Plan (continued)

Ref #	Improvement	Total Costs	Public Share	Private Share	Potential Funding Partner	Stage I	Stage II	Stage III	Stage IV	Stage V
	District-wide Programs									
D-1	Traffic Signal Timing	$720,000	$432,144	$287,856		$59,970	$59,970	$59,970	$59,970	$47,976
D-2	New intersections / signals	$5,196,000	$0	$5,196,000		$1,082,500	$1,082,500	$1,082,500	$1,082,500	$866,000
D-3	Signal Integration Program	$1,470,000	$882,294	$587,706		$122,439	$122,439	$122,439	$122,439	$97,951
D-4	Planning Studies	$6,000,000	$3,601,200	$2,398,800	Various	$499,750	$499,750	$499,750	$499,750	$399,800
D-5	Credit Fund	$3,283,982	$1,971,046	$1,312,936		$273,528	$273,528	$273,528	$273,528	$218,823
D-6	Incident Management	$2,500,000	$1,500,500	$999,500		$208,229	$208,229	$208,229	$208,229	$166,583
D-7	Traffic Count Program	$1,200,000	$0	$1,200,000		$250,000	$250,000	$250,000	$250,000	$200,000
D-8	Transportation Model Updates	$720,000	$0	$720,000		$150,000	$150,000	$150,000	$150,000	$120,000
D-9	Program Administration	$3,600,000	$0	$3,600,000	NJMC	$750,000	$750,000	$750,000	$750,000	$600,000
	Total Costs	**$95,392,752**	**$57,196,738**	**$38,196,014**		**$7,637,888**	**$6,803,372**	**$6,536,715**	**$8,754,989**	**$8,463,050**

	Program Budget Summary					
	Previous Balance	$0	$1,315	$837,146	$1,939,634	$823,848
	Current Stage Revenue	$7,639,203	$7,639,203	$7,639,203	$7,639,203	$7,639,203
	Total Stage Revenue	$7,639,203	$7,640,518	$8,476,349	$9,578,837	$8,463,050
	Stage Expenditure	$7,637,888	$6,803,372	$6,536,715	$8,754,989	$8,463,050
	Balance Forward	$1,315	$837,146	$1,939,634	$823,848	$0

VIII. FUTURE PLAN ELEMENTS

A. INTRODUCTION

Chapters III and V detail the methodology for identifying the recommended transportation improvements in the Plan. This chapter identifies and recommends several additional planning and policy initiatives that may warrant further study in the future. Although the following strategies have the potential to improve transportation conditions in the District, they did not meet the criteria for advancement and funding through the fee framework, as outlined in Chapters III and V. The NJMC may revisit these strategies for potential inclusion in future TPD plans.

B. PUBLIC TRANSIT

1. Background

In addition to the committed projects identified in Chapter III and recommended projects identified in Chapter V, the NJMC's *Meadowlands Mobility 2030* report proposes several transit improvements for the District and the surrounding area. These projects are generally regional in nature and include rail, park-and-ride (P-R), and bus priority lane proposals, as well as enhancements to bus service (see Table VIII-1).

These projects can be grouped into two timelines of planned development: mid-range and long-term. Mid-range transit projects typically take two to four years to implement. Generally, they involve infrastructure upgrades and can be more costly to implement than short-term improvements. The following are examples of mid-range strategies that are being considered to create more efficient and functional bus routes within the District:

- The implementation of bus priority routes on bus lines that are currently not running on time.
- The installation of bus-only lanes on routes where automobile traffic severely hinders bus travel.
- The installation of bus priority signaling along routes where traffic signal timings impede the flow of traffic and adversely affect bus running times.
- The implementation of new park-and-ride facilities to provide additional multi-modal transit options for District transit users.

Table VIII-1: Proposed Public Transit Projects Not Advanced in the Current Transportation Plan

PROJECT	TYPE
New Encap station on Bergen County Line	Rail
Hudson-Bergen Light Rail network – Meadowlands Sports Complex Extension	Rail
Hudson-Bergen Light Rail extension south to Secaucus Junction	Rail
Increase capacity on Main and Bergen County Lines	Rail
New station on Pascack Valley Line, near intersection of NJ 17 and 120	Rail
Sports Complex Extension – Phase II	Rail
New station to replace Lyndhurst and Kingsland stations on Main Line	Rail
West Shore Rail Restoration	Rail
Passaic-Bergen Rail (NYS&W), Hawthorne to Hackensack	Rail
Reinstituted rail service along Harrison Kingsland Rail Line	Rail
Enhanced Exclusive Bus Lane (XBL) on I-495	Bus
Bus priority along NJ Turnpike to connect with XBL	Bus
Bus priority along the NJ 3 East corridor to the XBL	Bus
Central Bergen Bus Rapid Transit (BRT)	Bus
North Hackensack Park-and-Ride	P-R
Carlstadt and Moonachie Park-and-Rides	P-R
Secaucus Junction Park-and-Ride	P-R

These improvements would help to solve future bus transit needs. Bus-only lanes would provide a reserved right-of-way and increase speeds of bus operations along busy arterials within the District. Additionally, priority signaling for buses would provide a smoother ride for customers, shorten delay time at intersections, and increase overall running times. Bus-only lanes would also segregate bus traffic from other types of traffic along congested arteries, reducing conflicts with other vehicles. This added benefit would make travel safer for bus operators and riders as well as for those in automobiles..

Long-range transit developments are generally the most costly and usually take the longest time to fund, construct, and implement (usually more than four years). They can also be expected to yield the greatest benefits to the District. Examples of long-range future strategies that are being considered to create a more efficient and functional multi-modal transportation network within the District are:

- The construction of new NJ TRANSIT commuter railroad stations as part of new development in the District to increase transit accessibility
- The reactivation of passenger rail lines within the District
- An extension of the Hudson-Bergen Light Rail system through Secaucus to reach the new Meadowlands and Xanadu sports and recreational complex.

These potential improvements would enhance travel in the entire District. First and foremost, any new rail transit infrastructure improvements in the District will attract new riders within the District and remove them from the already congested roadway network. The improvements could also spur commercial, retail, and recreational development in their immediate area. In addition, these rail improvements could alleviate traffic along major thoroughfares within the District (such as on NJ 3 and NJ 17, Paterson Plank Road, and Washington Avenue) by enabling people to travel on public transit lines that parallel these congested roads.

NJ TRANSIT has been conducting feasibility studies for several of the proposed projects shown in Table VIII-1, while the NJMC is considering adding park-and-ride "intercept" lots in areas on the periphery of the District. In conjunction with connecting shuttle and/or bus service, such park-and-ride lots could reduce the amount of traffic heading to and from District employment locations and through the District during peak commuting periods.

2. Potential Future Public Transit Strategies

The following potential future public transit strategies are recommended:

a. Conduct additional detailed analysis of proposed projects to further establish their locations and operational characteristics and to evaluate their potential impacts and/or benefits to the District. This investigation should include determining the degree to which the new or enhanced services can absorb District trips that might otherwise use the roadway network. Each analysis would be coordinated with the most likely future owner/operator of the proposed service, and a lead agency would be identified to conduct the work. The proposed MDTP contains funding to support this collaborative work.

b. Incorporate such analysis while updating the Plan and identify additional transit projects to include in it. As part of a revised schedule of District transportation improvements and a corresponding recalculation of costs, these projects may receive partial funding from the NJMC's fee assessment revenues, in proportion to the projected benefits to travel within the District versus benefits to the region.

C. PEDESTRIAN AND BICYCLE FACILITIES

1. Background

Chapter V also presents recommendations for specific pedestrian and bicycle connectivity improvements, including sidewalks, crosswalks, and Class III bicycle routes. The plans for the Secaucus Transit Village Redevelopment Area include bicycle paths and combination bicycle/pedestrian paths that will provide connections with the Secaucus Greenway. Additional improvements could be associated with other transportation projects. In particular, roadway and bridge projects should incorporate pedestrian and bicycle accommodations such as wide shoulders, sidewalks, and crosswalks.

"Traffic calming" measures along existing, improved, or new local streets could also help to improve access and safety for pedestrians and bicyclists. Such measures may include speed humps, raised crosswalks, curb bulb-outs, roundabouts, neckdowns, and chicanes.

In addition, landscaping and streetscaping improvements can provide a more conducive environment and enhanced amenities for pedestrians and bicyclists, including public transit users. These improvements could include benches, shelters, and bicycle racks.

Changes to traffic signal timing may also improve pedestrian safety. For example, increasing the length of certain phases would increase the time permitted for pedestrians to cross, or dedicated pedestrian-only or "scramble" phases could stop traffic in all directions.

2. Potential Future Pedestrian and Bicycle Strategies

Potential future pedestrian and bicycle strategies include the following:

a. An investigation examining potential locations and types of bicycle/pedestrian linkages needed within the District and in surrounding areas and a methodology to determine where and how to implement them.
b. Ensure that the planning for new roads, road widening, bridge replacements, and intersection upgrades includes a feasibility study for incorporating pedestrian and bicycle improvements into design and construction.
c. Investigate the potential application of other measures to improve pedestrian and bicycle access and safety within the District. These measures may include traffic calming, streetscaping, and revised signal timing. The proposed MDTP contains funding to support this collaborative work.
d. Investigate the potential for upgraded bicycle facilities within new transit-oriented developments inside the District. Upgraded facilities can include newly designated bicycle lanes on existing roadways, bicycle storage facilities at new and existing developments, improved bicycle facilities at transit stations, and more clearly defined signage at existing bicycle facilities.

D. TRAVEL DEMAND MANAGEMENT

1. Background

Travel demand management (TDM) refers to various strategies to reduce the number of vehicles on the road. TDM strategies rely on behavioral change to alter travel choices. Such strategies include ridematching for carpooling and vanpooling, telecommuting, parking management, and providing commuter information. On the statewide level, through NJDOT's Smart Moves for Business Program, participating companies can receive a credit for their state corporate taxes by administering an employee transportation program.

The NJDOT provides funding to several regional Transportation Management Associations (TMAs), which also receive financial support from member businesses. The primary TMA serving the Meadowlands District is Meadowlink Commuter Services (Meadowlink), located in Rutherford. Meadowlink is a non-profit corporation established to promote, educate, and

provide transportation and employment solutions for private industry, non-profit organizations, and municipalities. Meadowlink's activities include the following:

- Ridematching for carpools and vanpools. Meadowlink receives information from persons interested in ridesharing and provides them with a free matchlist of potential riders whose commute is similar to theirs and who want to share a ride. Meadowlink recently started a new program that offers a $100 gas card for all new carpools registered with Meadowlink.
- Shuttle bus service. Meadowlink sponsors several shuttle bus services that provide connections with key employment centers for commuters (see Chapter II).
- Emergency ride home. This program provides a taxi or sedan ride home in special cases for registered clients who carpool or vanpool or who use public transportation.
- Traffic alerts. Meadowlink provides free, timely faxed information on lane closures and major construction activities.
- Vanpool subsidies. Meadowlink pays the cost of empty seats in newly formed vanpools for the first three months. In addition, Meadowlink helps to obtain funding from the NJ TRANSIT Vanpool Sponsorship Program.
- Carsharing. In an effort to reduce both congestion and air pollution and to preserve open space within the District, the NJMC partnered with Meadowlink to study the market feasibility of a carshare program within the Meadowlands District. Under this concept, a fleet of vehicles serves a group of people who pay for the service based on usage. Although challenges are formidable (such as designating parking sites for carshare locations at major air and rail terminals), businesses and community groups responded positively to the concept. Based on these findings (and an assessment of existing transportation facilities, population density, and employment nodes within the District), Meadowlink has recommended the introduction of carsharing as a method of reducing congestion within the District.

Meadowlink also conducts demographic analyses, focus groups, and customer satisfaction surveys of businesses and employees. For example, in anticipation of Allied Junction (an office development proposed for the Secaucus Junction area), Meadowlink evaluated transit services from 14 neighboring municipalities. The report identified potential shuttle routes along major

corridors to access the station and provided details about the market, ridership, and costs of providing the service. In addition, Meadowlink helps member businesses develop and implement effective marketing programs for travel demand management. These programs may include customized brochures and flyers, informative transportation forums, and regular commuter newsletters. (See www. meadowlink.org for more examples of Meadowlink's services).

The Hudson Transportation Management Association (HTMA) offers similar programs and services focusing on Hudson County. The HTMA recently streamlined its operations and enhanced its commuter education program, including developing a new website (see www.hudsontma.org). The HTMA has been active in promoting alternative travel options as part of the NJ 139 rehabilitation project in Jersey City, such as the use of public transit and ridesharing. The HTMA is also providing a courtesy shuttle during the construction on NJ 139.

2. Potential Future TDM Strategies

Potential future TDM strategies include the following:

a. Assess the effectiveness of current TDM strategies and propose new or improved strategies.
b. Continue to explore opportunities for expanded or new shuttle services
c. Implement a pilot carsharing program based at all major Meadowlands-area intermodal hubs, including Secaucus Junction.

The proposed MDTP contains funding to support the collaborative development of new strategies

E. INTELLIGENT TRANSPORTATION SYSTEMS

1. Background

The phrase "intelligent transportation systems (ITS)" refers to various high-tech tools and strategies designed to improve traffic flow. These strategies may include systems to integrate traffic signals, manage traffic, respond to incidents, provide traffic information, and other components. These systems often include computerized arterial traffic signals, dynamic/variable message signs, closed-circuit television surveillance, highway advisory radio and phone systems, traffic movement detectors, and fiber optic communication networks.

Perhaps the best application for ITS is in addressing non-recurring congestion, or congestion caused by incidents such as crashes, breakdowns, and other roadway emergencies. The NJDOT has found that incident management systems can reduce incident-related congestion by up to 50%. In addition, ITS technology provides information that travelers can use to plan their trips to avoid incidents.

Current examples of ITS in the Meadowlands District include the following:

- E-ZPass toll collection technology along the NJ Turnpike
- Emergency service patrols along the NJ Turnpike
- Traffic camera at Exit 16/18E of the NJ Turnpike
- Variable message signs at NJ 3 & NJ 17 and NJ 3 & US 1/9
- Real-time traffic information from the NJDOT website

ITS initiatives are supported by the NJDOT's Statewide Traffic Operations unit, which is responsible for keeping traffic moving safely by quickly clearing incidents and providing real-time traffic information using the latest technology. Traffic operations centers in Elmwood Park and Cherry Hill operate traffic cameras, electronic variable message signs, and highway advisory radio transmitter sites. These centers support real-time traffic information online at www.njcommuter.com as well as several traffic reporting services and TRANSCOM.

Based in Jersey City, TRANSCOM also provides informational services. Its Operations Information Center collects and disseminates real-time incident and construction information, 24 hours a day, for more than 100 member agencies and affiliates. TRANSCOM's Regional Construction Coordination Program helps member agencies to avoid unknowingly restricting capacity on adjacent facilities or routes. This includes coordinating construction schedules both in advance and on a real-time basis during major incidents.

The NJDOT's *Capital Investment Strategy* (March 2006) includes the following proposed ITS improvements in the Meadowlands area:

- NJ 3 and the northern portion of NJ 17 as ITS corridors; as such, these corridors would receive priority for ITS funding

- Emergency service patrols along NJ 3, NJ 17, and US 1&9

The NJDOT *Ten-Year ITS Investment Strategy* (March 2005) also includes the following proposals:

- Install cameras at every interchange and at least every two miles in urban areas
- Install dynamic message signs and traffic detectors on each approach for interchanges with interstates, state highways, and other select roads
- Enhance operations centers, including a new center in the north

2. Potential Future ITS Strategies

The following potential future ITS strategies are recommended:

a. Estimate the impact of non-recurring congestion on the roadway network and assess the potential benefits of various ITS applications.
b. Endorse proposed projects, if appropriate, and identify other ITS applications

The proposed MDTP contains funding for developing signal integration and incident management measures for the District, in collaboration and cost sharing with the appropriate public agency partner.

F. GOODS MOVEMENT

1. Background

Goods movement facilities and activities are an important component of the transportation system within the District. Various methods of goods movement occur within District boundaries using trucks, trains, and airplanes. The goods movement network includes related facilities such as roadways, freight lines and yards, truck terminals, and ports. Given the District's location in the core of the New York City metropolitan area, many goods movement facilities are located in or near the District, near the following roadways and locations:

- All major highways (the NJ Turnpike, I-280, I-80, US 1&9, NJ 3, NJ 17, US 46, and NJ 495)
- Several important rail freight lines and rail yards (see below)
- Port Newark/Elizabeth, the largest marine port in the Northeast, located a short distance from the District, as well as the container facility at Port Jersey in Jersey City
- Newark Liberty International Airport.

Moving freight in northern New Jersey can be difficult. The tremendous influx of goods, coupled with the region's location within one of the largest consumer markets in the world, only intensifies the need to accommodate freight and goods movement in the northern New Jersey region. However, while northern New Jersey is poised to reap tremendous economic benefits by providing freight and logistics services, the region also faces serious challenges, many of which are unique. This highly developed geographic area now serves as the gateway to America for about 71 million tons of freight entering through Port Newark/Elizabeth, while another 10 million tons leave the country through the Port. Freight movement already strains the congested transportation network that must carry it.

Furthermore, goods movement in all modes (ship, rail, and truck) is projected to increase substantially in the future. The plans of all the major transportation agencies in the region – the NJDOT, Port Authority of New York and New Jersey, North Jersey Transportation Planning Authority, NJ Turnpike – call for improved, expanded, and new facilities to support this activity (e.g., Comprehensive Port Improvement Plan and Strategic Plan (Port Authority of New York and New Jersey) and Freight System Performance Assessment Study (NJTPA), available online at http://www.njtpa.org/Plan/LRP/Freight_study/fr_study_final_rpts.aspx.). The goods that move through the District are generated by regional economic activity as well as local needs and intermodal freight flows to and from other destinations, across the country, and around the world. Increased imports from China, India, and South America have forced the Port Authority to dredge its channels to make way for mega-ships that are expected to increase freight flow through the Port by as much as 65%. At the same time, the amount of freight that is moving by truck and rail from the West Coast is increasing, and will expand considerably as larger ships are unable to pass through the Panama Canal.

Existing and proposed goods movement facilities and flows directly affect how the District's transportation system functions. This impact is most evident along the US 1&9 (Tonnelle Avenue) corridor, which parallels rail freight lines that are the southern and eastern boundaries of the District. Rail lines that service the District are owned by Conrail Shared Assets; CSX; the New York, Susquehanna, & Western; and Norfolk Southern. Several rail freight yards are located in the District, including the following:

- Little Ferry Yard
- Ridgefield Auto Terminal
- North Bergen Yard
- Resources Intermodal Yard
- Croxton Yard
- Kearny Yard

As mentioned above, all the freight related agencies project major growth in future rail freight activity. This increase in rail traffic is may require capacity increases at the rail and intermodal freight yards in the district, which in turn may generate an increase the volume of truck traffic destined to and from them. One potential expansion project is at the Resources Intermodal Yard. In addition, while efforts are being made to expand the use of rail to transport goods in New Jersey, rail remains impractical for short-distance movements. Therefore, reliance on trucks will continue and the volumes of goods moved by trucks will expand. At the same time, the rail freight yards are necessary transfer points in this movement.

Among the various recent goods movement analyses are the NJDOT's Portway and Portway Extension studies. The Portway study recommends a series of 11 projects to improve access to and between the Newark-Elizabeth Air/Seaport Complex, intermodal rail facilities, trucking and warehousing/transfer facilities, and the regional surface transportation system. These projects include the St. Paul's Viaduct and Wittpenn Bridge replacements (see Chapter II) and a proposed "Northern Extension," a new road between St. Paul's Avenue and Secaucus Road, located to the west of US 1&9 in Jersey City. This road would provide a more efficient truck route and relieve congestion on US 1&9. The Portway Extension study proposes to extend this new road from Secaucus Road in Jersey City to Little Ferry.

2. Potential Future Goods Movement Strategies

The regional transportation model for this project does not specifically segregate, quantify, or evaluate rail freight activity and related truck traffic. It is anticipated that future plans may incorporate a more detailed analysis of such activity to enable the assessment of its impact on the local transportation network. Such analysis should include the following elements:

a. Conduct a detailed analysis of goods movement flows
b. Determine the impacts of goods flows on the roadway network, District-wide and region-wide

c. Assess the potential benefits of alternative projects to mitigate the impacts of goods movement both across the region and within the District.

This information would bring attention to the anticipated increase in truck traffic and help to identify roadways that are impacted by increased trailer truck flows. This analysis could identify the need for future improvements, such as modifying pavement or structural design, altering roadway grades for heavy vehicles, and changing the geometrics to permit longer vehicles to turn. The proposed MDTP contains funding to support collaborative work with appropriate public agencies with infrastructure or operations in goods movement.

G. ACCESS MANAGEMENT

1. Background

An important factor in traffic flow is the relationship of access driveways and other intersections with main roads. Congestion can be increased by too many driveways, driveways located too close to intersections, and development infringing on the roadway right-of-way. These situations can decrease efficient traffic flow and increase the likelihood of crashes. As new development occurs, developers will need to construct more streets and driveways to connect their projects with main roads; how they do so must be closely monitored and controlled.

The New Jersey State Highway Access Management Code governs the location and design of new openings onto state highways. (The code also authorizes counties and municipalities to adopt similar regulations.) Property owners seeking traffic access to state roadways must submit an application to the NJDOT for approval. Major permit applications, involving projects that would generate more than 500 daily vehicle trips, may require a developer to conduct a traffic impact study as the basis for receiving approval for an access permit. The NJDOT's Access Design Manual summarizes the traffic data, analysis, and design information that applicants must provide, along with the criteria for evaluating permit applications.

Once the NJMC has adopted this Plan and instituted impact fee assessment procedures for state highways in the District, the NJMC and NJDOT will need to coordinate, where appropriate, to clarify the relationship between improvement projects in the Plan and state highway access

requirements. This coordination will focus on the distinction between access "on site" requirements, such as driveways, left-turn lanes, and deceleration lanes, and off-site improvements that are part of the MDTP and within the fee assessment program.

Because existing NJDOT regulations address access management needs during the local development review process as part of "on site" needs, the Meadowlands District Transportation Plan does not need to include any additional access management strategies. Routine access permit requirements reside outside the scope of the Plan and the impact fee assessment process. There may be a need, however, for this Plan to address potential multi-site developments, or development clusters, which could generate roadway improvement and access management needs (like new intersections) that are not covered as part of on-site improvements and not specifically listed in the Plan.

2. Potential Future Access Management Strategies

The following potential future access management strategies are recommended:

a. Consider the need for access management strategies for new multi-site development areas beyond those included in the Plan based on a regional network and intersection/interchange needs assessment
b. Investigate the potential need to modify existing access management
c. Consider the possibility of adopting local access management regulations for the District.

H. INTERSECTION CONFIGURATION – PAVEMENT MARKINGS

1. Background

The physical configuration of intersections is a key determinant of how well traffic flows through the intersection and, by extension, along a roadway. A higher number of approach lanes, including turning lanes, enables the intersection to perform at a better level of service.

In some cases, roadways are wide enough for turning movements, but the pavement is not adequately marked. In such cases, relatively minor measures such as pavement markings and signage may improve traffic flow at intersections, without more costly roadway widening,

resurfacing, etc. Such markings can separate through vehicles and those turning left and right and potentially reduce delays, enhance safety, and improve traffic flow.

2. Potential Future Pavement Marking Strategies

In developing this Plan, the process for formulating intersection improvements includes some recommendations for re-striping intersections (see Chapter III). Since this study analyzed only a portion of all intersections within the District, further investigation could identify other intersections with the potential for expanded capacity through re-striping.

I. ROADWAY SAFETY IMPROVEMENTS

1. Background

The proposed roadway improvements in this Plan are primarily based on roadway capacity deficiencies, i.e., congestion. These improvements may not directly address future roadway safety problems. Safety problems could include narrow lanes, narrow or absent shoulders, poor roadway surface, inadequate signage or striping, and roadside hazards. These problems may occur at roadway locations that do not experience congestion. Such conditions suggest the future need to prepare improvement projects that address safety issues and needs along roads in the District.

NJDOT maintains a database of crash records for roads under its jurisdiction. The data includes information on crash locations, roadway cross-sections, drivers, vehicles, injuries, fatalities, weather conditions, et al. NJDOT uses this data to produce various reports, including statewide crash rates, rates by cross-section type, and rates by specific roadway segment. This data may provide the basis for planning and designing measures to mitigate roadway hazards and reduce future crashes. Roadway safety improvements include widening lanes, widening or adding shoulders, improving pavement, adding signs or striping, improving lane delineation and channelization, and mitigating roadside hazards through "clear zones" and other measures.

2. Potential Future Roadway Safety Strategies

Potential future roadway safety strategies include the following:

a. Use available accident data to assist in identifying specific safety issues and needs along roads in the District

b. Prepare roadway safety improvement projects to address needs
c. Incorporate roadway safety strategies into other proposed transportation improvement projects.

The proposed MDTP contains funding to support collaborative work with appropriate public agencies with responsibility for safety of system users.

J. INFRASTUCTURE/MAINTENANCE NEEDS

1. Background

The proposed transportation improvement projects in this Plan address the need for new or expanded capital facilities. In general, they do not consider or directly address the potential impact of new development on the costs of maintaining or operating transportation facilities and services, with the exception of transit operation costs. The enabling legislation can be interpreted to include the funding of some transportation maintenance and operation functions (or at a minimum, the equipment needed to complete those functions) from traffic impact assessment fees.

NJDOT maintains management systems that provide data on the condition of pavement and bridges under state jurisdiction. This data may provide the basis for identifying maintenance and rehabilitation priorities. The Pavement Management System (PMS) includes all interstate, toll, state, and US highways, plus significant county roads, and some local routes of regional importance. The pavement rating system is based primarily on two criteria: ride quality and surface distress. The Ride Quality Index (RQI) describes the comfort level by measuring roughness, and the Surface Distress Index (SDI) measures the severity of surface distresses such as cracking, patching, shoulder condition, shoulder drop, faulting, and joints. NJDOT uses these factors, in conjunction with roadway types, to determine priorities for resurfacing projects.

The Bridge Management System (BMS) includes all bridges with a span over 20 feet. The BMS lists the physical characteristics, condition, and ownership of each bridge. Each bridge receives ratings for structural condition and functional characteristics. NJDOT uses information on structural condition, bridge size, and roadway type to help to determine priorities for major bridge reconstruction and rehabilitation projects.

2. Potential Future Infrastructure/Maintenance Strategies

Potential future maintenance and operating strategies include the following:

a. Use NJDOT management systems and other similar data available from counties and towns to conduct periodic reviews of pavement and bridge conditions within the District
b. Use available data to identify roadway segments and bridges, not included in any improvement projects, that have maintenance and rehabilitation needs
c. Prepare improvement projects based upon maintenance and rehabilitation needs.

The proposed MDTP does not contain specific funding to support such effort, but the planning studies funds provided could be directed to using management system data to identify potential new projects infrastructure renewal projects.

K. SUMMARY OF PROPOSED FUTURE STRATEGIES

This chapter recommends several areas for additional analysis at varying scales (regional, district-wide, and sub-area). Additional investigation could identify concepts to add to the improvement program and establish the basis for MDTP's partial funding through fee assessment revenues. In all cases, it will be essential to distinguish between needs attributable to existing conditions and those attributable to future development, and between impacts and benefits for region-wide travel and impacts and benefits for travel within the District. The following is an outline of possible additional work activities that may be undertaken to identify a next generation of projects for the Plan.

1. Public Transit

a. Conduct more detailed feasibility studies of proposed projects, in collaboration with NJ TRANSIT.
b. Identify additional transit projects to include in the next version of the Plan.

2. Pedestrian and Bicycle

a. Incorporate pedestrian and bicycle accommodations into planning for new roads, road widening, bridge replacements, and intersection improvements

b. Investigate the potential application of other measures (e.g., traffic calming, streetscaping, and revised signal timing) to improve pedestrian and bicycle access and safety.

3. Travel Demand Management

a. Assess the effectiveness of current TDM strategies and propose new or improved strategies.
b. Continue to explore opportunities for expanded or new shuttle services.

4. Intelligent Transportation Systems

a. Determine the impact of non-recurring congestion on the roadway network and assess the potential benefits of various ITS applications.
b. Endorse proposed ITS projects, if appropriate, and identify other applications.

5. Goods Movement

a. Conduct a detailed analysis of goods movement flows.
b. Determine the impacts of the movement of goods on the roadway network.
c. Assess the potential benefits of alternative projects to mitigate the impacts of goods movement.

6. Access Management

a. Consider access management strategies for new multi-site development areas within the context of the adopted Plan's improvements and developer fee framework.
b. Investigate the potential need to modify existing access management.
c. Consider the possibility of adopting local access management regulations.

7. Intersection Configuration

a. Identify potential intersections with re-striping needs.
b. Prepare and implement new striping plans.

8. Roadway Safety

a. Use available accident data to assist in identifying specific safety issues and needs along roads in the District.
b. Prepare potential roadway safety improvement projects to address needs.
c. Incorporate roadway safety strategies into other proposed transportation improvement projects.

9. Infrastructure/Maintenance

a. Use NJDOT management systems and other similar data available from counties and towns to conduct periodic reviews of pavement and bridge conditions within the District.
b. Use available data to identify roadway segments and bridges not included in any improvement projects that have maintenance and rehabilitation needs.
c. Prepare improvement projects based upon maintenance and rehabilitation needs.

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